

**HABITAT LOSS FOR WILD DOGS IN RUAHA ECOSYSTEM:  
A CASE OF IRINGA RURAL DISTRICT, TANZANIA**

**JOSSAM SAMWEL MUNGURE**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN  
NATURAL RESOURCE ASSESSMENT AND MANAGEMENT OF THE  
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**CERTIFICATION**

The undersigned certifies that she has read and hereby recommends for the acceptance by the Open University of Tanzania a dissertation entitled: “**Habitat Loss for Wild Dogs in Ruaha Ecosystem: A Case Study of Kitisi, Makifu, Mahuninga and Tungamalenga Iringa Rural District-Tanzania**” in partial fulfillment of the requirements for the degree of Master of Arts in Natural Resource Assessment and Management (MANRAM) of the Open University of Tanzania.



Dr: Susan Rugano Gwalema

(Supervisor)

.....

Date

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## DECLARATION

I, **Jossam Samwel Mungure**, do hereby declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

.....

Signature

.....

Date

## **DEDICATION**

This work is dedicated to:

My beloved wife Eliarusia (Hon) and my children Aggrey, Doreen, and Mirisho (Andrew); your patience, encouragement, prayers and moral support were very valuable to me.

And

My parents Samwel Mussari Mungure and Christina Sawere Ndossi (all bereaved) for bringing me up and laying a good education foundation. May our Almighty God Rest their Soul in Eternal Peace Amen. My Sponsor Mr. Aminieli Mungure and all his family.

I will always remain grateful to you all.

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## **ABSTRACT**

This study assessed the extent of habitat loss in the Ruaha ecosystem. Specifically, it evaluated the root causes for habitat loss, discussed and examined the environmental implication of habitat loss and the efforts being made to restore the situation for wild dogs in Ruaha Ecosystem in Iringa Rural District. This work studied the contributing factors and presents the associated environmental implication – manifested by a decline of wild dogs’ populations and habitat loss. Qualitative and quantitative information were collected using Participatory Rural Appraisal (PRA) techniques that included: household interviews, focus group discussions, interview of key informants and field observations. 151 households, 10 focus group discussions in each village and 16 Key informants’ questionnaires in four sampled villages of Mahuninga, Kitisi, Makifu, and Tungamalenga were purposively selected for interview. Quantitative methods were used to analyze the data using IBM, SPSS and MS Excel computer programs while content analysis technique was used for qualitative information. The study findings revealed that demographic factors have been hampering the habitat loss and population growth that increases the high demand for natural resources is also a contributing factor towards habitat loss. The study recommends; adoption of the poverty reduction policies/strategies that are conservation-friendly, provision of adequate conservation status to critical wildlife areas, discourage policies, land uses and projects likely to have adverse impacts on habitats; enhance conservation education and research, involve local communities, institute participatory land use planning, provide adequate conservation incentive and discouraging the destruction of critical wild dog habitats.

## TABLE OF CONTENTS

<b>COPYRIGHT .....</b>	<b>iii</b>
<b>DECLARATION.....</b>	<b>iv</b>
<b>DEDICATION.....</b>	<b>v</b>
<b>ABSTRACT .....</b>	<b>vii</b>
<b>LIST OF TABLES .....</b>	<b>xiii</b>
<b>LIST OF FIGURES .....</b>	<b>xiv</b>
<b>LIST OF PICTURES.....</b>	<b>xv</b>
<b>LIST OF ABBREVIATIONS .....</b>	<b>xvi</b>
<b>CHAPTER ONE .....</b>	<b>1</b>
<b>INTRODUCTION.....</b>	<b>1</b>
1.1 Background to the Research Problem .....	1
1.2 Statement of the Research Problem .....	3
1.3 Objectives of the Study .....	4
1.3.1 General Objectives .....	4
1.3.2 Specific Objectives.....	4
1.3.3 Research Questions .....	5
1.4 Significance of the Study .....	5
1.5 Conceptual Framework .....	6
1.6 The Scope of the Study .....	7
1.7 Limitation of the Study .....	8
1.8 Structure of the Study.....	8
1.9 Summary of the Chapter .....	8



<b>CHAPTER TWO .....</b>	<b>9</b>
<b>LITERERATURE REVIEW .....</b>	<b>9</b>
2.1 Overview .....	9
2.2 Definition of Key Terms .....	10
2.3 Theoretical Framework .....	11
2.4.1 Habitat Status in Tanzania.....	11
2.4.2 Rate of Habitat Loss for Wild Dogs in Tanzania .....	12
2.4.3 Rapid Population Growth and Poverty.....	13
2.5 The Role of Wild Dogs in the Ruaha Ecosystem.....	14
2.6 What is the Environmental Implication of Habitat Loss for Wild Dogs? .....	15
2.7 Why Does the Problem Still Exist? .....	16
2.8 What has been Done by the Government to Protect the Wild Dogs? .....	17
2.9 The Research Gap .....	18
2.10 Summary of the Chapter .....	19
<b>CHAPTER THREE .....</b>	<b>20</b>
<b>RESEARCH METHODOLOGY .....</b>	<b>20</b>
3.1 Description of the Area of Study.....	20
3.2 Land Area and Land Use Pattern .....	20
3.3 Administrative Units .....	21
3.4 Climate and Soils .....	22
3.5 Rainfall .....	22
3.6 Drainage System .....	22
3.7 Agro – Ecological Zones.....	22
3.8.1 The Midland Zone .....	22

3.8.2	The Lowland Zone .....	23
3.9	Ethnic Groups.....	24
3.10	Population Size and Growth.....	24
3.11	Population Density .....	25
3.12	Research Design .....	26
3.13	Sample Size .....	26
3.14	Data Collection Methods.....	27
3.15	Primary Data .....	28
3.16	Household Questionnaire Interviews .....	28
3.17	Focus Group Discussions .....	29
3.18	Key Informants Interviews.....	29
3.29	Field Observation .....	30
3.20	Secondary Data .....	30
3.21	Data analysis and presentation .....	31
3.23	Chapter Summary.....	31
<b>CHAPTER FOUR.....</b>		<b>33</b>
<b>RESEARCH FINDINGS, RESULTS AND DISCUSSION.....</b>		<b>33</b>
4.1	Introduction .....	33
4.3	Sex and Marital Status.....	33
4.4	Age of Respondents .....	34
4.5	Education Level of Respondents.....	35
4.6	Wild dogs for Tourism .....	41
4.7	Ethnic Composition and Place of Origin of Respondents.....	42
4.8	The extent of habitat loss for wild dogs in Iringa Rural District.....	43

4.9	Access to Clean Drinking Water .....	44
4.10	The Root Causes for Habitat Loss for Wild Dogs in the Area of Study .....	46
4.11	Demographic Factors .....	46
4.12	Population Size and Growth.....	46
4.13	Population Density .....	47
4.13	Poverty .....	49
4.14	GDP and Per Capita GDP .....	49
4.15	Poverty Indicators .....	50
4.16	Income Poverty Rate, Poverty Gap .....	51
4.17	Sources of Energy for Cooking .....	51
4.18	Inadequate conservation status of some important breeding sites .....	53
4.19	Status of Land Availability in the Study Area .....	54
4.20	Inadequate Economic Incentive .....	56
4.21	Equity in Distribution.....	56
4.22	Failure of wildlife-related benefits to offset the costs.....	57
4.23	Failure to Compete Effectively with Alternative Land Uses .....	58
4.24	Conflict with Livestock Farmers.....	59
4.25	Environmental Implication of Habitat Loss for Wild Dogs in the Study.....	59
4.26	Ecological impacts .....	60
4.27	Chapter Summaries .....	62
	<b>CHAPTER FIVE.....</b>	<b>63</b>
	<b>CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>63</b>
5.1	Introduction .....	63
5.2	Conclusion.....	63

5.3	Recommendations .....	65
5.4	Areas for Further Research.....	67
	<b>REFERENCES .....</b>	<b>68</b>
	<b>APPENDICES .....</b>	<b>70</b>

## LIST OF TABLES

Table 3.1: Number of Households Chosen for Interview in each Village .....	26
Table 3.2: Number of Respondents Selected to Make a Total Sample.....	27
Table 4.1: Sex of Respondents.....	33
Table 4.2: Distribution of Respondents by Marital Status .....	34
Table 4.3: Distribution of Respondents by Age.....	35
Table 4.4: Distribution of Respondents by Education .....	36
Table 4.5: Economic Activities of Respondents .....	37
Table 4.6: Place of Birth of Respondents.....	43
Table 4.7: Wild Life – Induced Cost.....	58

## LIST OF FIGURES

Figure 1.1: Conceptual Framework Indicating the Likely Factors that Cause Habitat Loss for Wild Dogs in the Ruaha Ecosystem in Iringa Rural District .....	6
Figure 3.1: Map of Iringa Rural District Indicating Study Villages .....	20
Figure 3.2: Land Use Pattern in Iringa Rural District.....	21
Figure 4.1: Percentage Proportion of Cattle Population by Type, 2012 .....	40
Figure 4.2: Percentage of Households by Type of Water Source .....	45
Figure 4.3: Percentage of Households by Main Source of Energy for Lighting at Iringa Rural District, 2007/2008 .....	52
Figure 4.4: Percentage of Households by Main Source of Energy for Cooking in Iringa Rural District, 2007/2008 .....	53
Figure 4.5: Distribution of Land Ownership in Acres by Respondents .....	54

## LIST OF PICTURES

Picture 3.1: Focus Group Discussion at Makifu village .....	30
Picture 4.1: Growing Maize through Traditional Irrigation at Makifu Village .....	38
Picture 4.2: Drip Irrigation as Observed in Makifu Village.....	39
Picture 4.3: Grazing of Livestock as Practiced at Kisiti Village Near RUNAPA .....	40
Picture 4.4: The Packs Defending their Den in Mdonya Grea Kitisi Village .....	41
Picture 4.5: The Packs at Risk in Mdonya Area .....	42
Picture 4.6: Part of Msimbi Forest Reserve as Viewed from Makifu Villages.....	45
Picture 4.7: Agricultural Activities at Mahuninga Villages.....	48
Picture 4.8: Grass and Leaves used as Roofing Materials in Iringa Rural District....	50

## LIST OF ABBREVIATIONS

AWF	African Wildlife Foundation
CAWM	College of African Wildlife Management
CBD	Convention on Biological Diversity
CBFM	Community Based Forest Management
CBO	Community Based Organization
CCIAM	Climate Change Impacts, Adaptation and Mitigation
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Wild Animal Species
CPO	Council Planning Officer
EIA	Environmental Impact Assessment
FAO	Food and Agricultural Organization of the United Nations
GDP	Gross Domestic Product
GPS	Geographical Positioning System Ha Hectares
IPCC	International Panel on Climate Change
IUCN	International Union for Conservation of Nature and Natural Resources
JFM	Joint Forest Management
MBOMIPA	Matumizi Bora ya Mali hai Idodi na Pawaga
NP(s)	National Park (s)
PA(s)	Protected Area(s)
SADC	Southern African Development Cooperation
Sq. Km.	Square Kilometers



TANAPA	Tanzania National Parks
TSH	Tanzania shillings
TAWIRI	Tanzania Wildlife Research Institute
WD	Wildlife Division

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Research Problem

Globally, the highest rates of habitat loss are in Latin America particularly in the Amazon basin and Africa (WRI, 2001). Because of habitat loss especially deforestation, only about 31% of the earth's land surface is forested today (Deen, 2012). Tanzania holds an estimated one third of the world's remaining wild dogs, more wild dogs than any other country. In addition, the biggest surviving single population survives in Tanzania's Selous Game Reserve (TAWIRI, 2009).

Habitat loss is a critical factor contributing to loss of wild dogs and other biodiversity worldwide. The major forms of habitat loss are habitat degradation, whereby basic requirements of wildlife such as native species of food, shelter, dispersal areas, breeding sites and water are deprived. Fragmentation is another form of habitat loss whereby animals are squeezed into small patches and thus making them vulnerable to outside predators and humans. It may cause genetic erosion and reduction of the diversity of genes as a result of the increased chance of inbreeding. Anthropogenic activities are central factors to habitat loss in Tanzania. Overgrazing, poor agricultural practices, unplanned fires, deforestation to mention a few, cause wild dog habitat loss.

The impact of deforestation in Tanzania can be verified by a high rate of deforestation, which is estimated at 2.5% per annum (Kidegesho & Maganga 2000). Habitat loss is probably the great threat to Wild dogs in this planet today (Kidegesho & Maganga

2000). It is identified as a main threat to 85% of “Threatened” and “Enndangered” species described in the ICUN’s Red- List. The net loss in global forest area during the 1990s was about 94% million ha (equivalent to 2.4% of total forests) (Kidegesho & Maganga 2000). It is estimated that in 1990s almost 74% of deforested areas were converted to agriculture land (Kidegesho & Maganga 2000). Around half of the world’s original forests have disappeared, and they are still being removed at a rate of 10% higher than their possible level of re- growth (Kidegesho & Maganga 2000).

The trends on wildlife habitat in Tanzania, the high diversity of wildlife species and habitats has made Tanzania to be classified as one of the world’s four ‘Mega diversity nations’ along with the democratic Republic of Congo, Indonesia and Brazil. However, this reputation is rapidly being ruined by the loss of wildlife habitat, which is triggered by the rapid human demographic growth accompanied with the increase unsustainable use of natural resources. In 2005 Tanzania had about 35.3 million hectares forest and wood lands representing 39.9 of total land area (FAO, 2009). Out of these total area, 16.5 million ha of forest lie on village and general public lands which lack proper management. The governmental forest reserves are constantly threatened by encroachment and wild fires due to improper management.

The habitat loss has had a serious damaging impact on the fauna species inhabiting different localities. Likewise, due to this situation in Tanzania there is need to assess the extent of habitat loss, to identify what are root causes, and what can be the future environmental implications of habitat loss for wild dogs in Iringa Region particularly in Ruaha Ecosystem in Iringa Rural District in the villages of Mahuninga, Kitisi,

Makifu, Tungamalenga, as one of the remaining important areas for the breeding programme of wild dogs in Tanzania.

## **1.2 Statement of the Research Problem**

The impacts of habitat loss are crucial issues and obligate the habitat to be assessed and cured before a total loss of biodiversity in the ecosystem. The current wildlife habitat loss which includes wild dogs in Tanzania is estimated at 43% (Sikuwasha, 1998). Therefore, the problem is still a potential threat in the conservation of these creatures in the country.

Habitat loss is a critical factor facing many protected areas in Tanzania. Ruaha Ecosystem Iringa Rural District in Iringa Region is among the important areas which are rich in flora and fauna species and it is one of the important areas for breeding location for wild dogs. However, in recent years its species are facing extinction especially the wild dogs due to habitat loss. Ruaha ecosystem is threatened mostly by villagers, especially pastoralists who evacuated from Ihefu, formally (Usangu Game Reserve) water catchment areas in 2006-2007. Pastoralists settled in villages (Mahuninga, Makifu, Tungamalenga, Kitisi, Idodi, Malizanga, Mafuruto, Magozi, and Isele) in Ruaha Ecosystem in Iringa Rural District, practicing mixed farming, charcoal making, and lumbering.

Habitat status recently is declining in quality, (WMA- MBOMIPA, 2012) some plant species for example *Acacia albida* locally known as (Mpogoro), *Combretum*, and *Brachystegia* species, (Miombo) and other vegetations are being threatened by communities living adjacent to Ruaha Ecosystem. The major tribes living around

Ruaha ecosystem are Hehe, Sangu, and Bena. Other tribes from other regions include the Maasai, Sukuma, and Gogo to mention a few. These have contributed much to habitat degradation. According to Hehe, and Bena traditional elders, by 1980s -1990s Ruaha Ecosystem, was having dense vegetation and wild animals including wild dogs, greater kudu, bushbuck, impala, warthog, buffalo and bush pig were found even in village lands. Currently, these animals are rarely observed in village land because the community has destroyed their habitat for agriculture and charcoal making activities. Even the endangered species (black rhinos) were found in the Ecosystem in 1990s. But, they are no longer found there because their habitat has been destroyed by human activities.

The habitat loss is a crucial issue and it causes the wild dogs to be “Threatened” and “endangered”. This situation puts the specie in danger of being harmed or damaged and then disappearing from the Ecosystem. In order to rescue the habitat for wild dogs, it is important to identify the extent of the habitat loss, the root cause of the problem and establish the environmental implication for wild dogs in the study area.

### **1.3 Objectives of the Study**

#### **1.3.1 General Objectives**

The overall objective of the study was to assess the habitat loss for wild dogs’ Ruaha Ecosystems in Iringa Rural District Tanzania.

#### **1.3.2 Specific Objectives**

The dissertation was guided by the following specific objectives

- (i) To examine the habitat loss for wild dogs in the Ruaha Ecosystem-Iringa Rural District

- (ii) To evaluate the root causes of habitat loss in Ruaha Ecosystem Iringa Rural District
- (iii) To examine the environmental implications of habitat loss for wild dogs in Ruaha Ecosystem Iringa Rural District

### **1.3.3 Research Questions**

In line with specific objectives three research questions have been developed as follows:

- (i) What is the habitat loss for wild dogs in Ruaha Ecosystem Iringa Rural District?
- (ii) What are the root causes of habitat loss in Ruaha Ecosystem in Iringa Rural District?
- (iii) What are the environmental implications of habitat loss for wild dogs in Ruaha Ecosystem Iringa Rural District?

## **1.4 Significance of the Study**

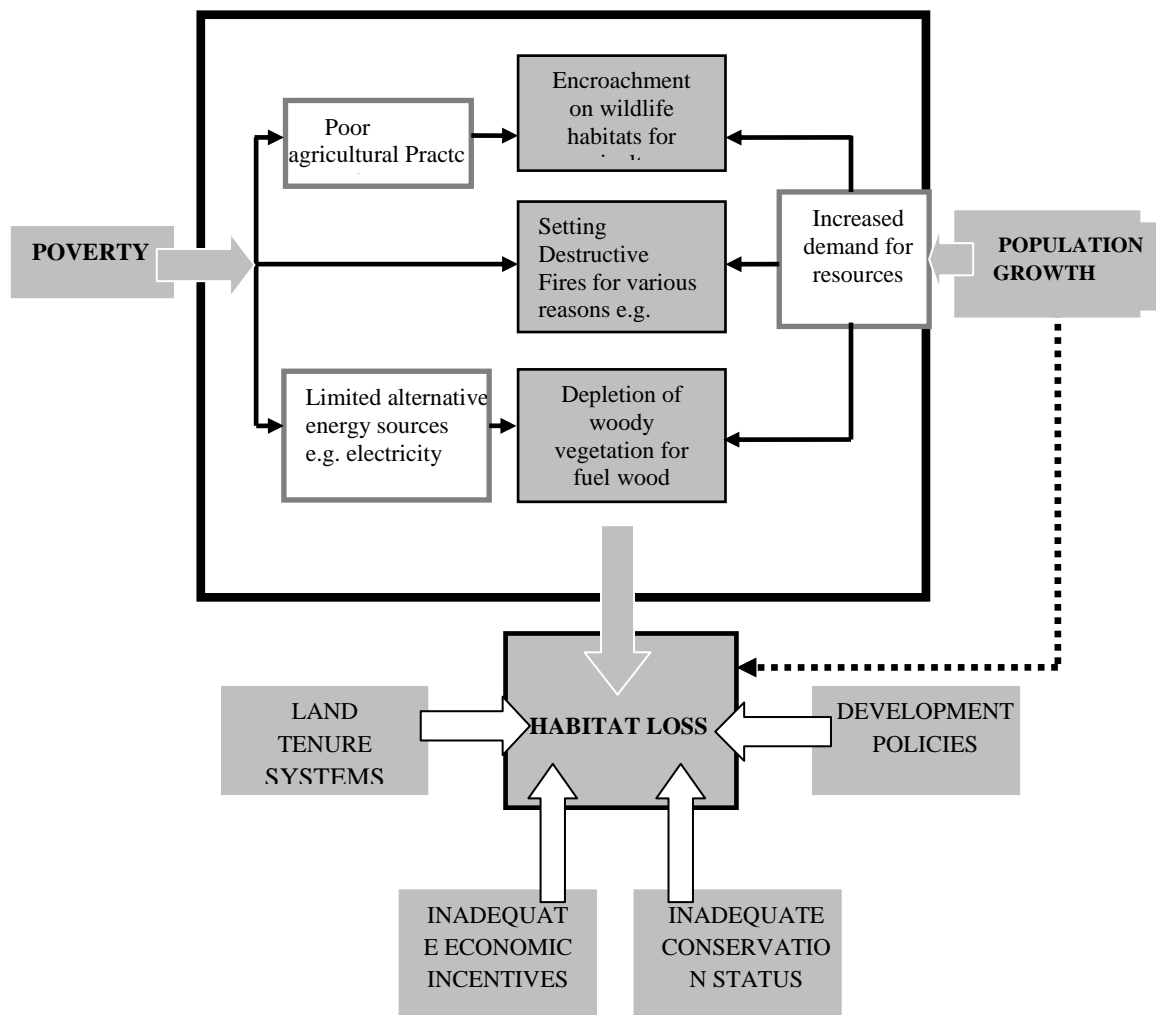
The information that have been generated from the study, can be used by the government in capacity building in wildlife conservation, and formulating habitat action plans, drafting of enabling legislation, instituting the participatory land use plan, preparing the management plans in the protected Areas (PAs) in Ruaha Ecosystem in Iringa Rural District. Moreover, the Tanzania Wildlife Research Institute Carnivore Action Plan can as well use the results to solve the problem of habitat loss in the Ecosystem.

## 1.5 Conceptual Framework

A conceptual framework is a basic structure of a research consisting of certain abstract ideas and concepts that a study wants to observe, experiment or analyze.

When these abstract concepts, are connected, we develop a conceptual framework.

Refers to a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Reichel and Raney, 1987).



**Figure 1.1: Conceptual Framework Indicating the Likely Factors that Cause Habitat Loss for Wild Dogs in the Ruaha Ecosystem in Iringa Rural District**

Source: Designed by the Researcher

The successful conservation of wild dogs will be among other factors depending on the involvement of rural communities. However, their acceptance to become involved in habitat management will depend on a number of factors including: level of awareness, current level of community involvement, economic strength or incentives, proper conservation status, law enforcement, and land tenure system. These factors are important in influencing people's behavior towards conservation initiatives.

Assessment of habitat loss in Ruaha Ecosystem, acts as an intervention project to assist in changing people's behaviour towards resources conservation. This research examined the extent of habitat loss, evaluated the root causes for habitat loss, and examined the environmental implication of habitat loss for the sustainable conservation of wild dogs in the Ecosystem.

## **1.6 The Scope of the Study**

This study was conducted in Ruaha ecosystem, specifically, Mahuninga, Kitisi, Makifu, and Tungamalenga villages in Iringa Rural District. The study sources of data and all information was gathered from experienced, skilled and knowledgeable conservationists from Ruaha National Park, (WMA-MBOMIPA), (DGO) Iringa Rural District, professionals, and other stakeholders who are aware about wild dogs in Ruaha ecosystem. The study focused to examine the extent of habitat loss, the root causes, and examined the environmental implication of habitat loss for wild dogs in the area of study.



### **1.7 Limitation of the Study**

All in the entire study did not go to the other side of the ecosystem i.e. Western side because the Ruaha ecosystem has a wide range. This could hinder the effectiveness of the research process. Fund was also a challenge to me since limited my reasonable time to collect some of the necessary data.

### **1.8 Structure of the Study**

This dissertation is organized in Five Chapters; Chapter One introduces background to the Research problem, Statement of the Research problem, Objectives of the study, Research questions, Justification/Significance of the study, Conceptual framework, The Scope and Limitations of the study.

### **1.9 Summary of the Chapter**

The current chapter dealt with the background to the research problem, Statement of the research problem, General and the specific objectives, Research questions, Justification/Significance of the study, Conceptual framework, The scope and Limitations of the study, and the structure of the study.

## CHAPTER TWO

### LITERERATURE REVIEW

#### 2.1 Overview

In this chapter an in-depth discussion of the available literature on the topic has been made. The high diversity of wildlife species made Tanzania to be classified as one of the world's four mega diversity nations along with the Democratic Republic of Congo, Indonesia and Brazil (<http://wings of Kilimanjaro.com>). All large carnivores need large areas to survive; yet wild dogs range more widely, and hence need larger areas, than almost any other terrestrial carnivore species anywhere in the world. As human populations encroach on its habitats, this threatened species are often the first to disappear, IUCN/SSC (2007).

Wild dogs have experienced major contractions in their geographic range within southern Africa, with resident populations known to remain 12% (wild dogs) of its historical range within the region. However, for much of the region (30 – 40%) there are no reliable data available regarding the status and distribution of the specie IUCN/SSC (2007).

Protected areas are very important for the conservation of wild dogs, but the majority of animals reside outside the protected areas which are the focus of most conservation effort. Three quarters of wild dogs' resident range, and two thirds of wild dog resident range, falls on community and private lands. Given this knowledge it is unlikely that populations inside protected areas would be viable if isolated from unprotected lands, and conservation activity outside protected areas is absolutely

critical for the long-term survival of this specie both inside and outside reserves (Ray, Hunter & Zigouris, 2005).

## 2.2 Definition of Key Terms

**Habitat-** Is the place or site where an organism or animal population naturally occurs and live. (Adopted from Convention on Biological Diversity).

**Bio-diversity-** Means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part (adopted from Convention on Biological Diversity (CBD)).

**Eco-system** –Any biological system withal its organisms which function as a unit in a given area, and which interacts with its physical environment in such a way that the resultant energy flow leads to recognizable biological units (Biomes) e.g. bushveld, evergreen forest, desert.

**Exotic species-** These are species which are introduced in a particular place for the economic or ecological purposes (CBD).

**Habitat loss-** Is the situation where wild homes are being destroyed or depleted and con or is the loss of food, water, space, and cover. Since wildlife all requires different habitats, loss can refer to a single tree or an entire forest.

**Habitat destruction-** is loss of wildlife habitats due to the misuse or mismanagement of land. Many animals are eliminated because of habitat destruction. Every time an animal is destroyed, other animals are affected.

**Habitat degradation-** occurs when the quality of the habitat is reduced and a decline in wildlife population results. If degradation is allowed to continue without management, an entire population can be lost.

**Population-** Members of the same species that live within a define areas at the same time.

**Pack structure** – A pack is defined as a collection of dogs of both sexes-containing at least one potential breeding pair normally starting from 6-10 dogs.

**Protected Area** –A geographically defined area which is designated or regulated and managed to achieve specific conservation objective (*Adopted from CBD*)

**Wildlife-** means those species of world and indigenous animals and plants, and their constituent's habitats, including wet lands and ecosystems to be found in Tanzania as well as those exotic species that have been introduced in Tanzania, and are temporary maintained in captivity or have become established in the world. (The Wildlife Policy of Tanzania Revised March 2007). (MNRT).

## **2.3 Theoretical Framework**

### **2.4.1 Habitat Status in Tanzania**

Tanzania has a total area of 94.5 million hectares out of which 88.6 million hectares are covered by land mass and the rest is inland water. The area covered by forests and woodlands is estimated to be 35.3 million hectares, which is approximately 40% of Tanzania's mainland (Blomley & Iddi, 2009; FAO, 2010; Milledge *et al.*, 2007). About 16.8 million hectares have been gazetted as forest reserves and 2 million hectares are found in national parks. All these are managed by the central

government, whereas the rest of the total forested land (about 16.5 million ha or 47%) are under general land and village land (un-reserved) which is largely unprotected and open to general access (Blomley & Iddi, 2009; Malimbwi & Zahabu, 2010; URT, 1998).

In the late 1980s World Resource Institute (WRI) estimated that Tanzania had 40,600,000 ha of open areas and 1,440,000 ha of closed forests and woodlands. The average annual extent of deforestation was 130,000 ha which is 0.3% per year (WRI 1989). Reforestation was only 7,000 ha per year, which is about 5.4% of the forests lost per year. Recently, the rate of deforestation has increased notably. Between 1990 and 1995, Tanzania was reported to have lost 1,613,000 ha of forests, on an average annual loss of 323,000 ha (Barrow et al 2000).

#### **2.4.2 Rate of Habitat Loss for Wild Dogs in Tanzania**

The rate of habitat loss is estimated to range from 130,000-500,000 hectares per annum (FAO, 2010). There is no accurate figure of deforestation because of inadequate forest inventories conducted. Between 1990 and 2005 the rate of deforestation has been estimated to be 412,000 ha per annum (Blomley & Iddi, 2009). It is from this alarming rate of deforestation and the extensive nature in forest resources that has resulted in the necessity of Tanzania being included in an international mechanism (Chiesa *et al.*, 2009; Yanda, 2011). Drivers of deforestation and forest loss include agricultural expansion, overgrazing, wildfires, charcoal making, infrastructure expansion and over-exploitation of wood resources (Chiesa *et al.*, 2009; FAO, 2010; MNRT, 1998; URT, 2009; Yanda, 2011).

The major sources of deforestation and forest degradation have been agricultural expansion and high demand of biomass energy for urban and rural areas (Chiesa *et al.*, 2009; FAO, 2010; Yanda, 2011). In 2002 it was reported that Tanzania lost 458,743 ha of forest because of charcoal making alone (Chiesa *et al.*, 2009). It is estimated that 90% of energy used in the country comes from forests (Chiesa *et al.*, 2009; Milledge *et al.*, 2007; World Bank, 2009; Yanda, 2011). Recent research has shown that between 1970 and 1998 Tanzania lost around 10 million hectares of forest land through uncontrolled clearing of forests, mainly for agricultural expansion (Milledge *et al.*, 2007). In Tanzania, agriculture accounts for 50% of the country's GDP and employs over 90% of the workforce (Chiesa *et al.*, 2009). The shifting nature of small scale agriculture practiced in most rural areas has been causing much of the deforestation in the country.

#### **2.4.3 Rapid Population Growth and Poverty**

From 2002 to 2012 the population in the District increased by about 8,999 people from 245,033 in 2002 to 254,032 in 2012. At division level, there were insignificant differences in the level of population change ranging from negative 10.3 percent (Isimani division) to 61.3 percent in Pawaga Division. The negative population increase observed in Kalenga and Isimani divisions was due to shifting of Mkoga, Mgongo, Nduli and Kigonzi villages from the two divisions in Iringa Rural District (NBS, Computed Data from 1988 and 2002 Population Censuses Reports). These factors which lead to increased demand for settlement areas, building materials, farmland, grazing grounds, firewood and charcoal (Leat, 2011, Malimbwi *et al.*, 2002).

These demands encourage felling of trees and hence, increased deforestation and forest degradation. Poverty (both income and human) which is prevalent in about 36% of Tanzania's population has a significant contribution to deforestation. Rural areas accommodate about 80% of Tanzania's population and more than 90% of the people use fuel wood.

Moreover, due to widespread unemployment and low income from agriculture, some people earn a living through the sale of charcoal and burnt bricks. Both activities cause deforestation. Also owing to the inability of many urban dwellers to afford alternative energy sources, such as gas, electricity and kerosene, majority of them depend heavily on wood fuels as a source of energy. Consequently, the mismanagement of fuel resources significantly contributes to deforestation and environmental degradation (Leat, 2011, Malimbwi *et al*, 2002). Rapid population increase and poverty may be one of the root causes of ecological disrupted.

## **2.5 The Role of Wild Dogs in the Ruaha Ecosystem**

The African Wild dog is classed as endangered by the IUCN, because it has disappeared from much of its original range (Lindqvist, 2010). Despite their threatened status (wild dogs are listed as endangered) wild dogs are important as top carnivores, and of value to Africa's tourism industry (Woodroffe & Ginsberg, 2005 IUCN, 2006a, Lindsey *et al.*, 2007). It also plays a vital role in third trophic level of the ecosystem. Its absence affects the energy flow and nutrient cycling in the entire ecosystem. Despite its significance, wild dog population is declining dramatically throughout Africa. The international Union for Conservation of Nature (IUCN) ranks the species as endangered and declining. IUCN estimated that only

3000 to 5500 adult wild dogs remain across the entire African Continent. They once lived in almost every country in Africa but are likely to extinct in all those countries today.

Wild dog Population trend is undergoing extinction because of natural and anthropogenic factors, (Durant *et al.*, 2005). Beside disease such as canine distemper and rabies which can be spread by domestic animals, the major problems that wild dogs face in the wild are snaring, road killings, increasing fragmentation of their habitat and human persecution since wild dogs are still being considered vermin in many places (Githiru, *at el.*, 2014). Canine distemper has wiped out most of wild dog packs in Africa.

Animal restoration begins with knowledge of why the species or animal community is currently absent or threatened at the site (Biology, *at el.*, 2001). Thus, Wild dog restoration aims at bolstering existing free-ranging populations or creating new free-ranging populations within the species' historic range. Wild dogs are an intensely social species in danger of extinction if nothing is done to halt their decline (Creel & Creel 2002; Woodroffe, McNutt & Mills 2004).

## **2.6 What is the Environmental Implication of Habitat Loss for Wild Dogs?**

Wild dogs are an intensely social species in danger of extinction if nothing is done to halt their decline (Creel & Creel 2002; Woodroffe, et al, 2004). Throughout Africa wild dogs have been shot and poisoned by farmers, hunters and, at one time, by rangers who consider them as bloodthirsty raiders of livestock and dispersers of wild herds. As the numbers of these wild dogs dwindle, they become more mysterious,



elusive and enigmatic, reappearing suddenly in places they have not inhabited for months and then vanishing again a few days later. Even though protected in parks and reserves, wild dog populations have declined to the point that packs may no longer be viable. (Packs mean the group of adult wild dogs usually six to ten). In some areas they are close to extinction. Also a 'pack' is defined as a collection of dogs of both sexes containing at least one potential breeding pair. Single sex 'groups' do not constitute a pack (Woodroffe, McNutt & Mills 2004).

Proactive and novel measures are needed to reverse this situation and promote ecosystem resilience (Ritchie et al., 2012). Wild dogs play a big role in ecosystem since they normally balance the carrying capacity through killing the weak and excessive species as their food and this situation help to reduce the risks of soil erosion and drought. There is growing interest worldwide in the restoration of top predators as a means of manipulating ecological processes and species abundance for the benefit of biodiversity conservation (Ibid, 2012). Unless Africa's Hunting Dogs are given the help needed for their recovery, the future of these fascinating animals is uncertain, we must act now to ensure their survival. (Creel & Creel 2002; Woodroffe, et al, 2004). *The author is needed*

## **2.7 Why Does the Problem Still Exist?**

The majority of Africa's protected areas are too small to conserve viable populations, and active conservation efforts on unprotected lands have hitherto been restricted to a handful of projects. Three factors have hindered conservation activity for wild dogs: The species' massive area requirements mean that conservation planning is needed on a daunting geographical scale, rarely seen before in terrestrial conservation.

Information is also lacking on the species' distribution and status, and on the tools most likely to achieve effective conservation. Capacity to conserve these species is lacking in most African countries; expertise in managing more high-profile species such as elephants and rhinos may not be transferable to wild dogs or cheetah because the threats and conservation challenges are different (Lindsey *et al*, 2007).

## **2.8 What has been Done by the Government to Protect the Wild Dogs?**

Tanzania has been successful in establishing PA network, which is the basis for conserving its country's biological diversity and whose long-term goal is to maintain great biological diversity, which contributes to healthy environment and growth of the economy. Tanzania has ratified important Conferences related to conservation and management of wildlife and other natural resources. It became a member to the CITES 1981, CMS in 1999, AEWA in 1999, Ramsar in 2000 and signed the Lusaka Agreements in 1996. Tanzania also ratified the SADC Protocol in wildlife Conservation and Law Enforcement in 2002. All these initiatives are aimed at better protection of Tanzania's natural heritage, and ensuring equitable benefits there from. The successful implementation of this policy depends on the efforts of all stakeholders (URT, 2007).

Recognizing these concerns, in 2006 the Cat and Canid Specialist Groups of the IUCN/SSC, in partnership with the Wildlife Conservation Society (WCS) and the Zoological Society of London (ZSL), initiated a Range wide Conservation Planning Process for wild dogs. The Range wide Conservation Planning Process has six stated objectives:

- (i) To foster appreciation for the need to conserve wild dogs particularly among conservation practitioners in range states.
- (ii) To collect information on wild dog distribution and abundance on an ongoing basis, in order to direct conservation efforts and to evaluate the success or failure of these efforts in future years.
- (iii) To identify key sites for the conservation of wild dogs including corridors connecting important conservation areas.
- (iv) To prepare specific global, regional and national conservation action plans for wild dogs.
- (v) To encourage policymakers to incorporate wild dogs' conservation requirements into land use planning at both national and regional scales.
- (vi) To develop local capacity to conserve wild dogs by sharing knowledge of effective tools for planning and implementing conservation action.

## **2.9 The Research Gap**

The study has decided to undertake this research because wild dogs are being ‘threatened’ and ‘endangered’ due to habitat loss. In Tanzania, few areas remain with low population densities of wild dogs such as the Ruaha Ecosystem in Iringa Rural District. Wildlife Policy of Tanzania provided a vision to the wildlife sub-sector that focus on the ministerial vision, as well as the National Development Vision 2025 on aspects regarding environmental sustainability and socio-economic transformations. Currently there is very little information about habitat loss for wild dogs in the Ruaha Ecosystem Iringa Rural District. The study reveals the extent of

habitat loss for wild dogs in Ruaha ecosystem in Iringa Rural District. The other authors have written about habitat loss for wild dogs in other places of the country.

## **2.10 Summary of the Chapter**

The current chapter dealt with the following areas, Overview, Definition of Key Terms, Theoretical framework, habitat status in Tanzania, Rate of habitat loss for wild dogs in Tanzania, Rapid population growth and poverty, The role of wild dogs in Ruaha ecosystem, What is the environmental implication of habitat loss for wild dogs, Why does the problem still exist? What has been done by the government to protect the wild dogs? and research gape.

## CHAPTER THREE

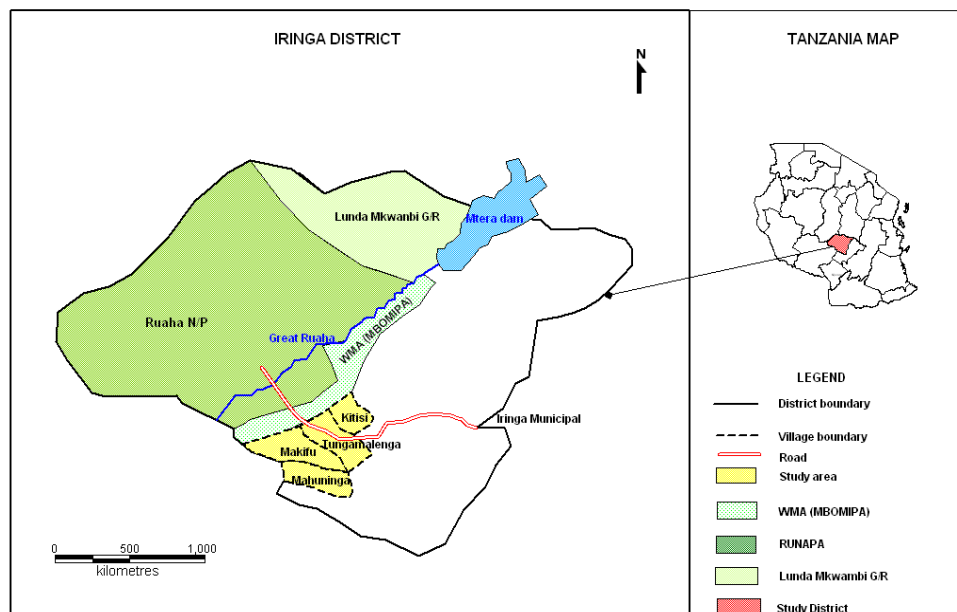
### RESEARCH METHODOLOGY

#### 3.1 Description of the Area of Study

Iringa Rural District lies between latitudes 7°.0" and 8°.30" south of the Equator and between longitudes 34°.0" and 37°.0" east of Greenwich. The District shares borders with Mpwapwa District (Dodoma Region) in the North, Kilolo District in the East, Mufindi District to the South, Chunya District (Mbeya Region) to the west and Manyoni District to the North West. The headquarters is located in Iringa Municipal.

#### 3.2 Land Area and Land Use Pattern

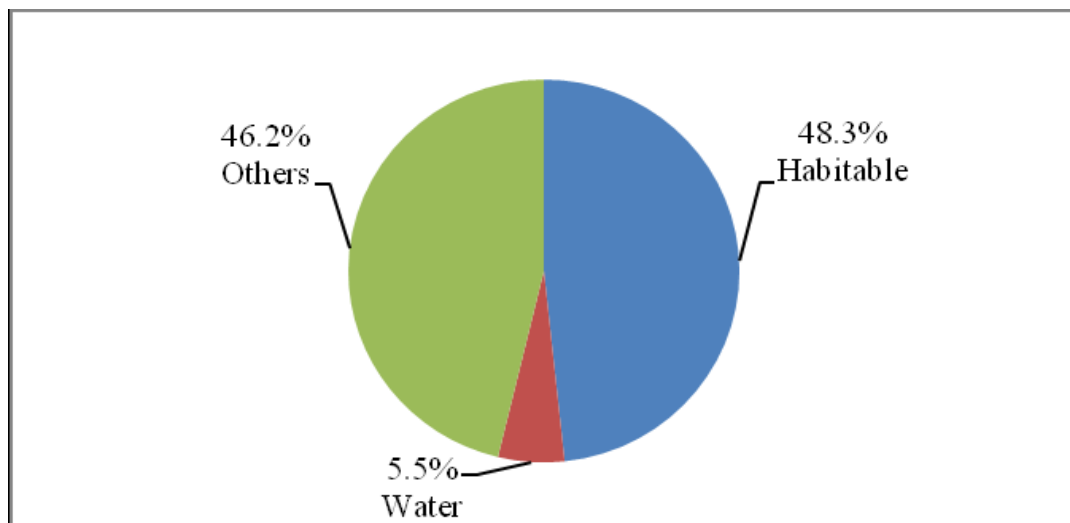
Iringa Rural District has a total area of 20,413.98 sq. kms which is about 34.9 percent of the total area of Iringa region most of which is plain land with very few hills or valleys. It is stated that only 9,857.5 sq.km are habitable, the remaining land being national parks, Rocky Mountains or water bodies.



**Figure 3.1: Map of Iringa Rural District Indicating Study Villages**

Source: Natural Resources Department (DFO) Iringa Rural District (2016)

About 9,437.5 sq. km are covered by the Ruaha National Park and 1,119 sq. km by water bodies. The arable land available is 479,258 hectares or about 23.5 percent of the district area. Out of this, only 184,465 hectares are actually cultivated annually. (Iringa Regional Commissioner's Office, 2013).



**Figure 3.2: Land Use Pattern in Iringa Rural District**

Source: Iringa Rural District Executive Director's Office –Land, Natural Resources and Environment Department, 2013

### 3.3 Administrative Units

The District is divided into 6 divisions and 25 wards with a total of 123 villages and 718 hamlets distributed unevenly. Isimani Division covers about 14.0 percent of total area of the district followed by Kiponzero Division with about 10.6 percent of the total area. Pawaga Division has the smallest area in the district constituting only 3.4 percent of the total district area. Idodi Division, though has the largest percentage share of district area, most of the area is occupied by the Ruaha National Park (10,411.3 sq.km) leaving only 2,427.6 sq. km. for human activities. (Iringa Regional Commissioner's Office, Administrative Units, 2013).

### **3.4 Climate and Soils**

The climate of the district varies with altitude and closely associated with two distinctive landscape zones namely the midland and the lowlands.

### **3.5 Rainfall**

The district receives rainfall of between 600mm and 1,000mm annually, falling between the months of October or November and December and a dry season from January to February or March and a second lower peak occurs in February or March and the rains then tail off in April or sometimes May. (Iringa Region Socio-Economic Profile, 2013).

### **3.6 Drainage System**

Iringa Rural District lies between 800 meters and 1,800 meters above sea level and forms the main watershed separating rivers flowing from south westward to the north east. It is mainly drained by River Ruaha.

### **3.7 Agro – Ecological Zones (AEZ)**

Like climate, there are 2 agro-ecological zones and associated landscape zones. The main economic activities in these zones are determined by the climate, altitude and soils. (Iringa Region Socio-Economic Profile, 2013).

#### **3.8.1 The Midland Zone**

This zone is found in Mlolo, Kiponzelo Kalenga divisions, Nduli and Kihogorota wards in Ismani division. It is characterized by an undulating topography with scattered mountain hills and plateau at an altitude of 1,200 metres and 1,600 metres

above the sea level. The District experiences moderate mean rainfall, ranging from 600 mm to 1,000 mm annually with mean temperature ranging from 15°C – 20°C.

Most of the soils in this zone have high nutrient contents and are considered suitable for a wide range of food and cash crops and therefore have the potential for profitable cultivation. The main crops grown in this zone include tobacco, sunflower, maize, simsim, vegetables;- onions, carrot, cabbages and tomatoes, beans, cowpeas, sorghum and fruits including mangoes, guavas and paw paws. The zone is also suitable for livestock keeping including cattle, pigs, poultry, goats and sheep. (Iringa Region Socio-Economic Profile, 2013).

### **3.8.2 The Lowland Zone**

The Zone comprises of Pawaga, Idodi and part of Isimani division and lies between altitudes 900 and 1,200 metres above the sea level. It is semi-arid or commonly known as the marginal area, due to low mean rainfall which range from 500 mm – 600 mm and relatively hot with temperatures ranging between 20°C – 25°C, the highest temperatures being experienced from September to October. The zone has very rich soils suitable for agriculture but the agricultural production level is low due to unreliable rainfall.

Therefore, farmers depend mainly on irrigated agriculture along River Ruaha and the Mtera Dam using traditional and improved schemes and canals. Crops grown in this zone include paddy, cotton, millet, cassava, groundnuts, bananas, onions, tomatoes and fruits such as mangoes, oranges and pawpaw. (Iringa Region Socio-Economic Profile, 2013 11).



### **3.9 Ethnic Groups**

The main ethnic group in Iringa Rural District is the Hehe. They constitute almost 90 percent of the entire population. Their major occupation is farming while livestock keeping is practiced on a small scale. Other ethnic groups found in the district include the Bena, Kinga, Pangwa and Wanji mainly found in and around large tobacco plantations owned by Greek settlers in the north, central and south eastern parts of the district which cover Kalenga, Mlolo, Kiponzeo, Idodi, Pawaga and Isimani divisions. Other minority tribes include Gogo, Sukuma, Barbaig and Masaai found in the lowland zone of Pawaga, Idodi and Isimani at Izazi and Malengamkali wards. These lowlands are rich in pastures, which have attracted these pastoralists to come along with their livestock and settle there. (Iringa Region Socio-Economic Profile, 2013).

### **3.10 Population Size and Growth**

The population growth of Iringa Rural District has experienced declining growth rate. Growth rate of the district declined from 2.2 percent during the 1978 - 1988 intercensals to 1.3 in 1988 -2002 intercensal period. According to the 2002 Population and Housing Census the District had 363,605 people in 1988 compared to the estimated 245,033 inhabitants in 2002. The decline of the district population, among other factors, was due to the anticipated establishment of Kilolo District from Iringa Rural District. Out of the estimated district population of 245,033 persons, 138,284 or 56.4 percent were females. Compared to other Districts of Iringa Region, Iringa Rural District was the second populous rural District in the region after Mufindi District and contributed 27.0 percent of the regional population. Between

1988 and 2002 the district's population grew at an average annual growth rate of 1.3 percent compared to the regional growth rate of 1.6 percent and national average growth rate of 2.4 percent. Growth rates for 2002-2012 for the District have not been released by the National Bureau of Statistics. (National Bureau of Statistics, GIS unit, 2013).

### **3.11 Population Density**

The average population density of Iringa District increased slightly from 12.0 persons per sq. km in 2002 to 12.4 persons per sq. km in 2012. Iringa Rural is the least densely populated district in Iringa Region and it is below the regional average population density of 23.4 persons per sq. km in 2002 and 26.3 in 2012. Among other reasons, the relatively small population density of Iringa Rural District has been caused by its relatively large land area. In 2002, Mlolo Division with a population density of 67.1 persons per sq. km was the most densely populated division in the district; followed by Kalenga Division with 45.4 persons per sq. km. Isimani Division was the least densely populated division as it had only 19.4 persons per sq. km.

In 2012, Mlolo division continued to be the most densely populated division with population density of 67.5, followed by Kalenga (45.2) and Pawaga (44.2). Isimani Division was the least populated division with 17.4 persons per sq. km. The population density of Idodi Division had been affected by the land occupied by the Ruaha National Park. (Population Density by Region and Ranking, Tanzania Mainland, 1978, 1988, 2002 and 2012 Censuses).

### 3.12 Research Design

The study used both qualitative and quantitative research approaches in order to minimize costs (Agrest and Finlay 2009). The design is flexible and economic (Colhan 2004). Cross section design was used since it allows data to be collected at one specific point in time and detection of patterns of association among variables, (Bryman, 2004). Key Informants were obtained from (RUNAPA), (WMA-MBOMIPA), (DGO, DFO), CPO, Iringa Rural District, and 2 Officers from Ant poaching Unit (APU) Iringa Zone.

### 3.13 Sample Size

The study covered Iringa Rural District, especially the four villages Mahuninga, Kitisi, Tungamalenga, and Makifu adjacent to protected areas of Ruaha National Park, (RUNAPA) and Wildlife Management Areas, (WMA- MBOMIPA) Lunda Mkwambi Game Reserve. In this study a random sample of 6% of the total number of households in each sampled village were randomly selected for questionnaire interview as indicated in Table 3.1. In each household a questionnaire was administered to the household heads whether male or female.

**Table 3.1: Number of Households Chosen for Interview in each Village**

Village Name	Category	Households	Sample (n)
Kitisi	Denning sites	360	22
Makifu	Anthropogenic factors	640	38
Mahuninga	Anthropogenic factors	950	57
Tungamalenga	Impacts of tourism	570	34
<b>Total (N)</b>		<b>2520</b>	<b>151</b>

Source: Field Survey (2016)

In each sampled village a sample of 10 village Natural Resources Committees and Environment, above 28 years were randomly selected for Focused Group Discussion. The sample included males and females to minimize biases. In four sampled villages a total of 40 respondents were selected for focus group discussion. For key informant interviews, a total of sixteen individuals were selected. This included: the DGO, DFO, one game ranger from Iringa Rural District, Chief Park Warden, Park Ecologist, one senior park ranger (RUNAPA), 2 Game Officers and 3 Game Rangers from Ant poaching Unit Iringa Zone and 5 members from (WMA-MBOMIPA). In total, the sample size for the whole study had a total of 207 respondents (Table 3.2) that included: 151 for household questionnaire interview, 40 for FGD and 16 for key informant interview.

**Table 3.2: Number of Respondents Selected to Make a Total Sample**

Method	Kitisi	Makifu	Mahuninga	Tungamalenga	Others	Total
Households	22	34	38	57	0	151
Focus group discussion	10	10	10	10	0	40
Key Informants Interview	0	0	0	0	16	16
Total	32	44	48	67	16	207

Source: Field Survey (2016)

### 3.14 Data Collection Methods

Both secondary and primary data were collected through different methods. According to Kothari (2004), secondary data refers to data which have already been collected by someone and already have passed through statistical process whereas

primary data refers to those collected afresh and for the first time. Secondary data includes published and unpublished ones.

### **3.15 Primary Data**

Both qualitative and quantitative data were collected from the study area. Different methods (triangulation of methods) were used in order to increase the reliability of data collected and reduce errors. The main data collection methods that were used included the follow

### **3.16 Household Questionnaire Interviews**

Simple random sample was used to collect household data and get people's views on various issues relevant to this study. The questionnaire had both closed and open ended questions. The questions were set in English and translated in Kiswahili that is understood by most Tanzanians. Questionnaire was administered verbally by the researcher or research assistants who had been trained on how to administer them. For those who couldn't understand Kiswahili an interpreter was used to translate in the local vernacular language and their responses were written down by the researcher or research assistant. In order to avoid biasness a simple random technique used to get respondents where by number of respondents noted, folded, rotted and displayed on the table. One person was invited to pick one notted folded papers with their numbers.

The number picked correlated with the established sample frame to get names of respondents. Various questions relevant to the study were asked to capture different information including: general characteristics of the household such as age, sex,

marital status, education and other background information. The questions were also used to capture people's views on factors that contributed to habitat loss and on why people having negative attitudes towards conservation initiatives. The questionnaire was applied to all sampled villages, but those questions for Key Informants by using purposive techniques were somehow different in order to get views from government.

### **3.17 Focus Group Discussions**

Focus group discussions were conducted with 10 representatives from each village. These were randomly selected based on their gender and age group. The sample was composed of males and females that represented youth from the Age of 28 years and above so as to get long experience information data. The sample basically included some representatives of village environmental committees and natural resources. This selection process reduced bias to have better results. Then a meeting was convened in each village where semi structured and unstructured questions were administered and discussed together to get views on various issues of the study. The responses were recorded for further analysis (Plate 3.1).

### **3.18 Key Informants Interviews**

The purposive technique was applied to get key informants interview, a total of 16 respondents were selected, this include, District Game Officer (DGO), DFO, one Game Ranger Iringa Rural District, Chief Park Warden, Park Ecologist, Senior law Enforcement Warden (RUNAPA), and 5 respondents from (WMA-MBOMIPA), and 4 Ant poaching Unity (APU) Game Officers, and 1 Economist Iringa Rural

District . Their responses were recorded for further analysis. In total, there were 16 Key Informant interviewees.



**Picture 3.1: Focus Group Discussion at Makifu village**

Source: Field Survey (2016)

### **3.29 Field Observation**

Field observation was carried out in the study area focusing on the targeted habitat loss patterns in each village to gain insight into the extent of habitat destruction, threats, and loss, the observation technique helped to fill insufficient description from interviewee

### **3.20 Secondary Data**

Secondary data collected from various published and unpublished sources including books, journals, papers, reports, periodicals and other publications relevant to the study. The major resource centers were the Library of Sokoine University of

Agriculture (SUA), The Open University of Tanzania (HQs) College of African Wildlife Management- Mweka, Tanzania Wildlife Research Institute (TAWIRI), DGO & DFO, CPO Iringa Rural District Council, (RUNAPA) and the internet Search.

### **3.21 Data analysis and presentation**

The collected data organized, summarized, analyzed, Presented and interpreted by using pie charts, bar graphs, frequency tables, and described. Both quantitative and qualitative methods used to analyze data. Quantitative data was analyzed by using SPSS and MS-Excel computer programs, while content analysis technique was used for qualitative data.

### **3.22 Limitations of the Study**

There were a few limitations faced during data collection exercise. The major difficulty was accessibility to the targeted areas of study because of the nature of the areas. Another limitation was how to get information from respondents on forest product they use. Some people feared that the researcher was a government agency sent to investigate them about those issues because more than 75% use forest products and other natural resources directly.

### **3.23 Chapter Summary**

The current chapter dealt with the following areas, Description of the area of study, Geographical location, Land area and land use pattern , Administrative unit, Climate and soils, Rainfall, Drainage system, Agro ecological zones (AEZ), The midland



zone the lowland zone, Ethnic groups, Population size and growth, Research design, Sample size, Data collection, Primary data, Household questionnaires interview, Focus group discussion, Key informants interviews, Field observation, Secondary data, Data analysis, and Presentation, Limitation of the study.

## CHAPTER FOUR

### RESEARCH FINDINGS, RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter presents the major findings of the study. The first part presents the general characteristics of the population under study. This includes the discussion on gender (sex), age, marital status, education level, economic activities and household sizes of respondents. The second part evaluates and discusses about the extent, and the root causes of habitat loss for wild dogs in the Ruaha Ecosystem in Iringa Rural District. The third part discusses and evaluates on what can be the environmental implication to the wild dogs in the Ruaha ecosystem in Iringa Rural District.

#### 4.3 Sex and Marital Status

Respondents from the 151 households surveyed, 43.7% of them were males and 56.3% were females. The ratio was so because in most cases males are bread winners, therefore, during household surveys more females than males were found at home. Most males had gone to perform various activities for their families. Most of the time women are left at home taking care of children.

**Table 4.1: Sex of Respondents**

Sex	Kitisi		Makifu		Mahuninga		Tungamalenga		Total	
N=151	F	%	F	%	F	%	F	%	F	%
Male	10	6.6	14	9.3	16	10.6	26	17.2	66	43.7
Female	12	7.9	20	13.2	22	14.6	31	20.5	85	56.3
Total	22	14.6	34	22.5	38	25.2	57	37.7	151	100

Source: Field survey data (2016)

**Key:** F= Frequency, %= Percent, N= Sample size

These findings are also similar to the National status based on the 2012 Census; where country-wide there are more females (23.1 million) (51%) than males (21.9 million) (49%) (URT, 2013). This explains why female respondents were more than males in the study.

In the sampled population most (52.3%) of the respondents were married and the singles comprised the minority (Table 4.1). From these results it can be concluded that the majority (almost 84%) of households in the sampled villages were managed by married couples, implying strong social institutions. These findings are similar to those reported by DED Iringa Rural District, (2015), that the majority of households were managed by married couples in Districts of Iringa rural and Iringa Municipal that was associated with increased social interaction.

**Table 4.2: Distribution of Respondents by Marital Status**

Marital Status N=151	Kitisi		Makifu		Mahuninga		Tungamalenga		Total	
	F	%	F	%	F	%	F	%	F	%
Married	7	4.6	17	11.3	21	13.9	34	22.5	79	52.3
Single	3	2.0	2	1.3	3	2.0	4	2.6	12	7.9
Divorced	5	3.3	7	4.6	5	3.3	6	4.0	23	15.2
Widowed	7	4.6	8	5.3	9	6.0	13	8.6	37	24.5
<b>Total</b>	<b>22</b>	<b>14.6</b>	<b>34</b>	<b>22.5</b>	<b>38</b>	<b>25.2</b>	<b>57</b>	<b>37.7</b>	<b>151</b>	<b>100</b>

Source: Field Survey (2016)

**Key:** F=Frequency, %= Percent, N=Sample size

#### 4.4 Age of Respondents

The majority (almost 23.9%) of interviewed respondents had ages ranging from 58-67 years followed by those aged between 38-47 (22.5%), (Table 4.3). People older than 45 years constituted 59%. Members of this group have experience of the past and current conservation efforts where lessons can be drawn from.

**Table 4.3: Distribution of Respondents by Age**

Age group	Kitisi		Makifu		Mahuninga		Tungamalenga		Total	
	F	%	F	%	F	%	F	%	F	%
N=151										
28-37	5	3.3	8	5.3	7	4.6	10	6.6	30	19.9
38-47	7	4.6	6	4.0	8	5.3	13	8.6	34	22.5
48-57	4	2.7	9	6.0	7	4.6	11	7.3	31	20.5
58-67	4	2.7	5	3.3	11	7.3	16	10.6	36	23.9
68>	2	1.3	6	6.0	5	3.3	7	4.6	20	15.3
<b>Total</b>	<b>22</b>	<b>14.6</b>	<b>34</b>	<b>22.5</b>	<b>38</b>	<b>25.2</b>	<b>57</b>	<b>37.7</b>	<b>151</b>	<b>100</b>

Source: Field Survey (2016)

**Key:** F=Frequency, %= Percent, N=Sample size

The findings show that, at Kitisi, ages of respondents ranged from 28 and above years with a mean age of 48.2 years while at Makifu the age ranged from 30 to 90 years with a mean age of 54.2 years. At Mahuninga and Tungamalenga age ranged from 17 to 92 years with a mean age of 48.4 years. The active group (28-60 years) constituted almost 76%. This has implication on natural resource management as people of this group are considered to exert high pressure on natural resource utilization especially forests and land for agricultural purpose to meet family needs. The Economist and Agricultural Officers of Iringa Rural, stated that the high proportion of active group inhabitants implies a high pressure on natural resource utilization more than 10 members.

#### **4.5 Education Level of Respondents**

The field survey data indicated that in the sampled population, 41.1% had attained primary education, while 11.3% had no formal education and 29.8% attained secondary education and post secondary education were 17.9 (Table 4.4). This finding indicates low literacy (29.8% primary education) and high degree of illiteracy (11.3%- lacking formal education). This makes it difficult when it comes to knowledge transfer on various issues related to environmental management.

**Table 4.4: Distribution of Respondents by Education**

Education	Kitisi		Makifu		Mahuninga		Tungamalenga		Total	
N=151	F	%	F	%	F	%	F	%	F	%
Non-Formal	6	4.0	3	2.0	4	2.6	4	2.6	17	11.3
Primary	7	4.6	15	9.9	16	10.6	24	15.9	62	41.1
Secondary	6	4.0	9	6.0	11	7.3	19	12.6	45	29.8
Post Secondary	3	2.0	7	4.6	7	4.6	10	6.6	27	17.9
<b>Total</b>	<b>22</b>	<b>14.6</b>	<b>34</b>	<b>22.5</b>	<b>38</b>	<b>25.2</b>	<b>57</b>	<b>37.7</b>	<b>151</b>	<b>100</b>

Source: Field Survey (2016)

**Key:** F=Frequency, %= Percent, N=Sample size

According to CPO Iringa District (2016), a low level of education in a given society is considered as an indicator of poverty. Having a considerable number of people lacking formal education in a given society may indicate a high degree of poverty. Low education level status denies people some economic opportunities which would have been an alternative to other unproductive economic activities. Such people have mainly relied on farming.

As a result, these communities are more vulnerable to the impacts of climate change and variability because of a low adaptive capacity. Low education status has an implication on widespread environmental destruction because of inadequate economic alternatives. Larger proportion of females lacking formal education may in one way or another influence their level of decision making on various issues important for their development. This can also make them fail to attain some important knowledge which can improve the environment and their living standards.

It was also observed that the younger generation seemed to be more educated than the elderly. For example, 11.3% of all respondents lacking formal education (not

attended school) were above 60 years old, and none of those who had attained secondary education. Those who had attained secondary education belonged to the young generation (28-37 years) (2%), and the mature group (46-60 years) (2%), followed by those belonging to middle age (36-47 years) age group (1%).

The emerging young generation possessing secondary education has been contributed by efforts made by government to build primary and secondary schools. However considering the young generation and the middle age, those who have attained secondary education are still very few (3%), implying that more efforts are still needed to fight illiteracy in the area. This has an implication in knowledge transfer even to issues related to conservation.

In the sampled villages Tungamalenga had a high level of literacy compared to other villages whereas Kitisi had higher proportion of illiteracy. Respondents with secondary education at Tungamalenga, Makifu, Mahuninga and Kitisi were 12.6 %, 7.3%, 6.0%, and Kitisi 4.0% respectively. Those lacking formal education for Kitisi, Mahuninga, and Makifu, and Tungamalenga were 4.0%, 7.3 %, 6.0%, and 12.6% respectively.

**Table 4.5: Economic Activities of Respondents**

Economic Activities	Kitisi		Makifu		Mahuninga		Tungamalenga		Total	
	F	%	F	%	F	%	F	%	F	%
N=151										
Crop Production	10	6.6	12	7.9	15	9.9	20	13.2	57	37.7
Employed	2	1.3	4	2.6	4	2.6	8	5.3	18	11.9
Trading	2	1.3	5	3.3	6	4.0	7	4.6	20	13.2
Agro-pastoral	8	5.3	13	8.6	13	8.6	22	14.6	56	37.1
<b>Total</b>	<b>22</b>	<b>14.6</b>	<b>34</b>	<b>22.5</b>	<b>38</b>	<b>25.2</b>	<b>57</b>	<b>37.7</b>	<b>151</b>	<b>100</b>

Source: Field Survey (2016)

**Key:** F=Frequency, %= Percent, N=Sample size

Major economic activities in the sampled villages included: crop production that accounts for 37.7%, agro-pastoralists 37.1 %, trading 13.2% and formal employment 11.9% (Table 4.8) Crop production is one of the economic activities that can be practiced by the majority of people lacking formal education. According to the 2002 census report (URT, 2004), farming in Iringa Rural District accounts for 91.1% whereas livestock keeping accounts for 1.6% of economic activities. Combining agro-pastoralists and crop producers, farming accounts for 96% who depend on land and forest resources. This has an implication for ongoing environmental degradation in the area of study.

It is observed that agricultural expansion, charcoal making and overgrazing are major drivers of deforestation and forest degradation in Tanzania (MNRT, 1998; URT, (2009, 2012); Yanda, 2011).



**Picture 4.1: Growing Maize through Traditional Irrigation at Makifu Village**

Source: Field Survey (2016)

Another economic activity observed in the study area was agro-pastoralism that accounted for 14.4% of interviewed respondents. Plate 4.2: Agro-pastoral is mainly practiced in Makifu and Mahuninga villages, (URT, 2004).



**Picture 4.2: Drip Irrigation as Observed in Makifu Village**

Source: Survey Data (2016)

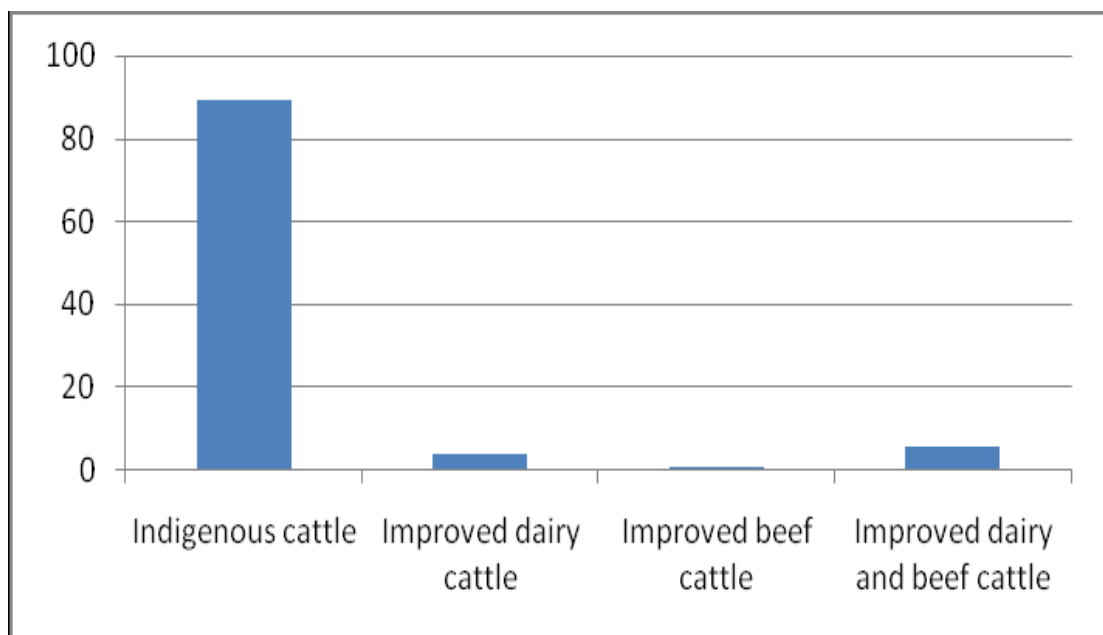
Kitisi it was mainly free ranging grazing land was found to be a problem facing agro-pastoralists. In Tungamalenga village livestock are grazed in open lands and sometimes in nearby Protected Areas including the Ruaha National Park and the WMA-MBOMIPA, People of this area do not have grazing lands. This has an implication in causing environmental degradation including forest degradation. It was reported by the DFO- Iringa Rural District that illegal grazing in Msimbi forest reserves 15,780 ha, in Makifu village was a major problem during the dry season done by villagers living adjacent to reserves such as livestock keeping has been a normal practice. From the focus group discussion conducted in Kitisi, some of the respondents were complaining that the number of cattle was increasing over time.



The increasing number of cattle was threatening people's efforts to plant trees and other crops. Sometimes cattle were feeding on few trees planted. Failure to control the number of cattle in the area would in the future cause more land degradation.



**Picture 4.3: Grazing of Livestock as Practiced at Kisiti Village Near RUNAPA**  
 Source: Field Survey Data (2016)



**Figure 4.1: Percentage (Proportion) of Cattle Population by type, 2012**

Source: District Executive Director's Office (Livestock Department), Iringa Rural District, 2013

Figure 4.1 show those indigenous cattle were the most dominant cattle type in the District. They accounted for 90.2 percent of total cattle population in the District while improved dairy cattle (6,579) accounted for 4.1 percent of the cattle population. Improved beef cattle were the least in number at 1,253 (0.8 percent).

#### **4.6 Wild dogs for Tourism**

The findings show that, wild dogs represent a most valuable resource in Iringa Region being the country's major tourist attractor hence a major source of foreign exchange earnings. Iringa Rural is the luckiest District in Iringa Region by being the leading district in the region endowed with many and fairly large wildlife conservation areas that support a diversity of wildlife species. Ruaha National Park and Lunda Mkwambi Game Controlled Area are the home of wild dog species in the District. Apart from elephant, buffalo and lions, kudu happens to be the most unique wildlife animal found only in Ruaha National Park. Photographic, tourism, researching and camping are the only activities permitted in national parks. Hunting is only permitted in game controlled and WMAs.



**Picture 4.4: The Packs Defending their Den in Mdonya Grea (Kitisi Village)**  
**Source:** Field Survey Data 2016



**Picture 4.5: The Packs at Risk in Mdonya Area**

Source: Field Data (2016)

#### **4.7 Ethnic Composition and Place of Origin of Respondents**

The findings revealed that Hehe was the dominant ethnic group in this area. Among the sampled household respondents, Hehe constituted 92.5% while other ethnic groups constituted only 7.5% (Table 4.6). Other ethnic groups found in the study area were: Masai, Mangati, Bena, Ngoni, Pangwa, Wanji, and Nyakyusa.

The mixture of tribes at Tungamalenga may have been contributed by the fact that the village is dissected by the main road from Iringa town division that is connect to Dar es Salaam, Mbeya from RUNAPA. Additionally, at Tungamalenga and Makifu there is an irrigation scheme which attracts many people to come for agricultural activities mainly for rice farms and petty businesses (MBOMIPA, 2014). The findings are similar to those reported by DGO (2016) that pastoralists from Ihefu they have been a challenge towards natural resources conservation in the study area.

The findings also asserted that the majority of respondents (31.1%) in the study area were born outside respective villages while 21.2% were born in their respective villages within Iringa District, 23.2% were born outside Iringa region and only 24.5% was born outside Iringa District but within Iringa region. Findings indicate that people of the area are closely related in terms of culture and other ways of living.

**Table 4.6: Place of Birth of Respondents**

Place of Birth/Origin	Kitisi		Makifu		Mahuninga		Tungamalenga		Total	
	F	%	F	%	F	%	F	%	F	%
N=151										
Born in the village	7	4.6	7	4.6	8	5.3	10	6.6	32	21.2
Born outside the village but within the District	5	3.3	10	6.6	11	7.3	21	13.9	47	31.1
Born outside the District but in this region	4	2.6	9	6.0	10	6.6	14	9.3	37	24.5
Born outside this region	6	4.0	8	5.3	9	6.0	12	7.9	35	23.2
<b>Total</b>	<b>22</b>	<b>14.6</b>	<b>34</b>	<b>22.5</b>	<b>38</b>	<b>25.2</b>	<b>57</b>	<b>37.7</b>	<b>151</b>	<b>100</b>

Source: Field Survey (2016)

**Key:** F=Frequency, %= Percent, N=Sample size

#### **4.8 The extent of habitat loss for wild dogs in Iringa Rural District**

Iringa Region is one of the best forest cover in the country though there is at great risk of forest depletion due to the population growth which creates demand for fuel wood and other human activities as the population increases. As a percentage it occupies 15.5 percent of the total land area. Until 2012, out of 3,303,280 hectares of the Regional land area, about 363,828 hectares is covered by 98 forest reserves owned by the district councils and villages

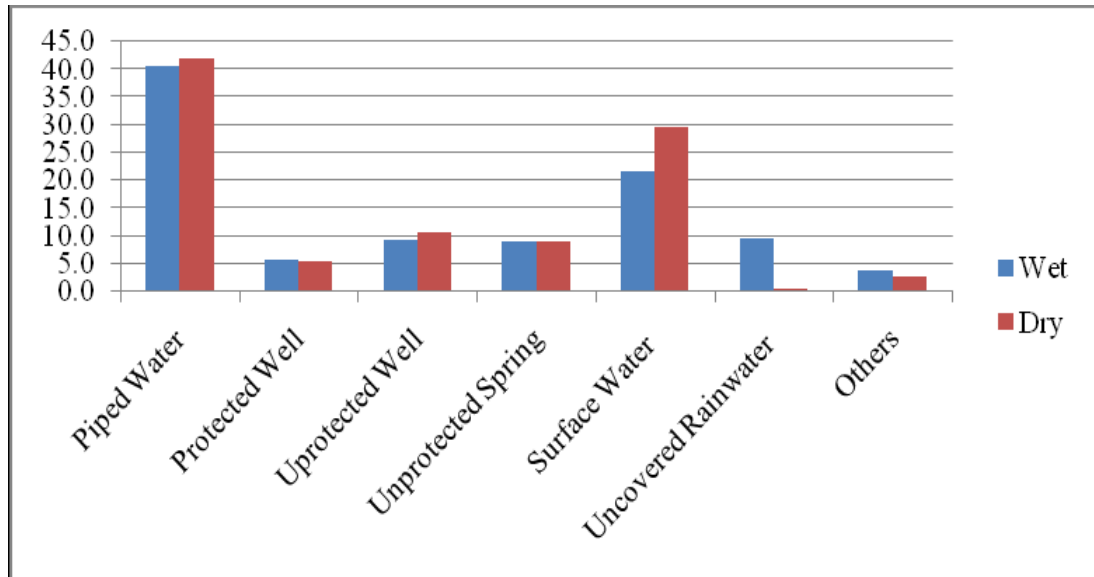
Iringa Rural District is one of the few Districts in Tanzania producing most of the forest products including timber, wood logs and wood fuels such as fire wood and charcoal. Unfortunately, the district authorities fail to get reliable data on the production of forest products and their values due to the ban on tree cutting in the from natural forests which results in not reporting the production done illegally.

Tanzania, one of the African countries, is by no means exceptional to this scenario. Findings show that, Iringa Rural District has an area of 20,413sq km, which is about 34.9% of total area of Iringa Region. Only 9,857.5 sq km is habitable. The rest is covered by RUNAPA which is about 9,437.5sq km. Arable land is 479,258 ha, which is 23.5% of the District area. Out of this, only 184,465 ha, are cultivated annually (District Economist 2016). The impact of this loss is manifested by Local extinction of fauna species and increased number of species that are prone to extinction in different localities (e.g. Miller and Harris 1977; Newmark 1996; Hassan 1998; Gamassa 1998; Brooks *et al* 2002; Kideghesho 2001). Understanding the root causes and ecological impacts inflicted by habitat destruction on biodiversity is essential in devising the effective mitigate measures.

#### **4.9 Access to Clean Drinking Water**

The findings show that, topography and existence of a permanent drainage system are the main reasons for the reliable sources of water in the study area and there is insignificant variation in the sources of water during wet and dry seasons. Data from the National Sample Census of Agriculture 2007/08 show that the piped water was the main source of drinking water in Iringa Rural District (40.7 percent) followed by surface water, including rivers, dams, streams and lake (21.7 percent), unprotected

well (9.6 percent), unprotect springs (9.4 percent) while a small percentage (9.1 percent) used protected well.



**Figure 4.2: Percentage of Households by Type of Water Source**

**Source:** NBS, National Sample Census of Agriculture, Iringa region, 2007/08



**Picture 4.6: Part of Msimbi Forest Reserve as Viewed from Makifu Villages**

**Source:** Field survey Data (2016) (*Photo by Jossam Mungure*)

According to the local community in the study area, the habitat loss was accelerating rather than abating and that it was taking place largely within the legal boundaries of the PAs. They reported the greatest loss between 1990s and 2015s, despite the great

efforts made by researchers and conservationists had invested in the area. In the last 25 years about 30 and 40% of PAs' vegetation community has been changed, leading to a change in fauna populations (DFO- Iringa Rural-2016). Showing concern over the status of wild dog's habitats in the ecosystem, one of the respondents stated that: 'Areas, which we knew as wilderness, and ecologically significant have been disrupted.

#### **4.10 The Root Causes for Habitat Loss for Wild Dogs in the Area of Study**

In this section some factors contributing to habitat threats, destruction, and loss have been evaluated and discussed. These factors included: Demographic factors, which includes (deforestation, bushfire), poverty, population growth, land tenure systems, development policies, economic incentive and inadequate conservation status.

#### **4.11 Demographic Factors**

##### **4.12 Population Size and Growth**

The population of Iringa Rural District has experienced declining growth rate as shown in Table 4.3. Growth rate of the district declines from 2.2 percent during the 1978 – 1988 intercensals to 1.3 in 1988 -2002 intercensal period. According to the 2002 Population and Housing Census the District had 363,605 people in 1988 compared to the estimated 245,033 inhabitants in 2002. The decline of the district population, among other factors, was due to the establishment of Kilolo District from Iringa Rural District. Out of the estimated district population of 245,033 persons, 138,284 or 56.4 percent were females. Table 1.3 shows the population sizes growth rates for Iringa Region and its districts for the 2002 and 2012 censuses.



#### **4.13 Population Density**

The average population density of Iringa District increased slightly from 12.0 persons per sq. km in 2002 to 12.4 persons per sq. km in 2012. Iringa Rural is the least densely populated district in Iringa Region and it is below the regional average population density of 23.4 persons per sq. km in 2002 and 26.3 in 2012. Among other reasons, the relatively small population density of Iringa Rural District has been caused by its relatively large land area (1988-2002 population census Report).

Over the last three decades, areas of Makifu, Mahuninga, Kitisi and Tungamalenga in Iringa Rural District, have experienced high population growth. The period between 1990 and 2015s recorded the highest rate of increase i.e. 10% per annum. Of this, only 3.4% was contributed by natural increase while the rest was due to in migration (URT 2012). The current population in the four districts to the East of the PAs is over two million with annual growth rate exceeding the national average of 2.9% (URT 20012). In migration from within and even from neighboring Regions appears to be the major factor stimulated by good agricultural land, wildlife (as a source of protein), water bodies (Ruaha rivers and Mtera dam for Fishing), and livestock keeping (WMA-MBOMIPA 2016).

One of the problems of high population in close proximity to the borders of protected areas is growing pressure from local people to open protected lands for community use (WMA-MBOMIPA 2016). This scenario is evident in Wildlife Management Area (WMA- MBOMIPA) where its boundaries have been encroached causing 15% loss of the original area (DGO -Iringa Rural District 20016). Expansion of arable



land and settlements in the study area had led to shrinkage of the grazing land for livestock, which is increasing simultaneously with human population.

Statistics obtained from Iringa District, indicated 52% increase of livestock units from 175,680.5 in 1990 to 266,624.5 in 2006. This had implication on land requirements for livestock, which increased from 2108.1 to 3199.5, respectively. This lowered the carrying capacity, which was already considered to be exceeded 15 years ago (Iringa District Agricultural Officer 20016). The confinement of livestock into small areas causes overgrazing, soil erosion and siltation of water bodies (Author's. observation, 20016). These villagers, however, are continuing to encroach the areas illegally by violation of conservation laws in order to survive.



**Picture 4.7: Agricultural Activities at Mahuninga Villages**

**Source:** Field survey data (2016) (*Photo by JossamMungure*)

### **4.13 Poverty**

Poverty is defined as “a state of deprivation associated with lack of incomes and assets, physical weakness, isolation, vulnerability and powerlessness” (Chambers 1987:8-9). It is considered a rural phenomenon in Tanzania, where about 22% and 39% of its population live below the food poverty line and basic needs poverty line, respectively (URT 2002). The proportions living below US\$1 and US\$2 per day are 19.9% and 59.7%, respectively, thus making 41.6% of the population live below the national poverty line (UNDP 2003).

### **4.14 GDP and Per Capita GDP**

Iringa Rural District economy continues to be dominated by the agricultural sector. Both cash and food crops are produced, with the latter dominating. According to the results of the 2008 Regional Gross Domestic Product Survey, agriculture sector contributes close to 99 percent of the district’s GDP, of which crop production sub sector contributed about 83.9 percent followed by livestock (14.8 percent) while hunting, forestry and fishing accounted for less than a percent. Services and industry sectors account for about 0.8 and 0.2 percent respectively. The relatively poor performance of the manufacturing sector results from a combination of factors.

These include absence of large and medium scale industries, increased competition from imported manufactured goods in wake of trade liberalization and inefficiency of import substitution, inadequate working capital and high production costs. From definition the per capita GDP is affected by the population size. In 2008 the per capita GDP of Iringa Rural District was estimated to be Tshs. 1,031,508.

#### 4.15 Poverty Indicators

As stated earlier, beside GDP and per capita GDP, there are a number of indicators that portray the poverty level. These indicators include gini coefficient, poverty gap, and percent of households below basic needs poverty line, main source of cash income, food consumption patterns, net enrolment, adult literacy rate, health indicators and access to safe drinking water. They also include housing conditions in terms of types of toilets, roofing materials, household's assets, and sources of lighting energy as well as sources of cooking energy.

Due to low purchasing power, villagers in Iringa Rural District can barely afford modern and improved technologies and agricultural inputs required for high crop production. Yet more production is inevitable in order to cope with high demand for food created by rapid human population growth. Expansion into new lands - including sensitive areas for wildlife, such as migratory corridors and dispersal areas – therefore, becomes the most feasible strategy to this end. Essentially, land shortage in western Iringa Rural District, can be ascribed to poor agricultural practices.



**Picture 4.8: Grass and Leaves used as Roofing Materials in Iringa Rural District**

**Source:** Field survey (2016) (*Photo by Jossam Mungure*)

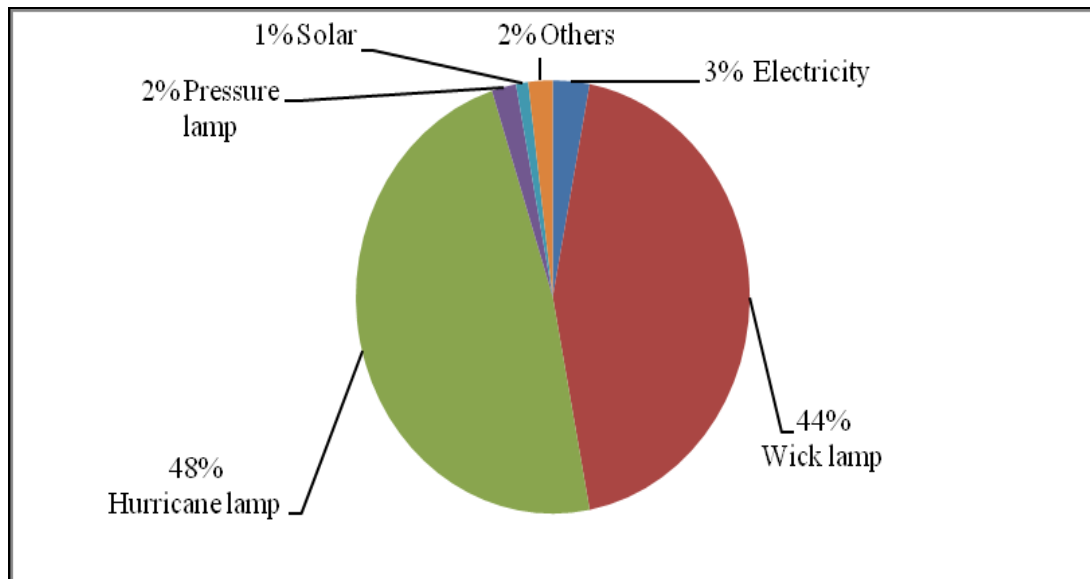
#### **4.16 Income Poverty Rate, Poverty Gap**

Iringa Rural District was not among the best 20 districts on Tanzania Mainland in regard to the least number of people living below the basic needs poverty line, and at regional level, it is considered to be one of the best districts according to the 2010/2012 Poverty and Human Development Report.

The Report indicated that as much as 30 percent of Iringa Rural District residents lived below the basic needs poverty line. The best district is Iringa Urban where only 17 percent of its people live below basic needs poverty line followed by Kilolo (29 percent) and Iringa Rural district (31percent). The district with high percentage of people living below the basic needs poverty line in Iringa Region was Mufindi at 32 percent.

#### **4.17 Sources of Energy for Cooking**

As reported in the Iringa Region Profile of the 2002 Population and Housing Census, firewood remains the most prevalent source of energy for cooking. This also applies to Iringa Rural District as according to the National Sample Census of Agriculture 2007/08, 98 percent of the households in the District use it, followed by charcoal (2.0 percent). An insignificant number of the households reported using modern and/or environmental friendly source of energy for cooking such as electricity, solar energy and bottled gas. If the current practice continues, deforestation and depletion of natural vegetation through using firewood and charcoal will destroy the nature and ecology of Iringa Rural District. Measures should be taken to ensure that natural vegetation and ecology of the district are restored.



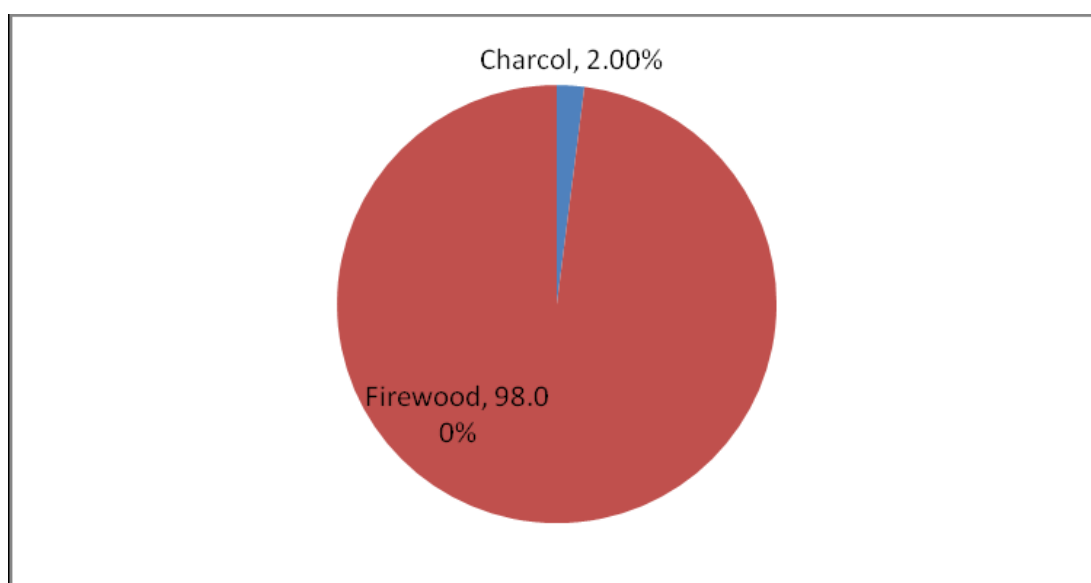
**Figure 4.3: Percentage of Households by Main Source of Energy for Lighting at Iringa Rural District, 2007/2008**

Source: NBS, National Sample Census of Agriculture, *Iringa* region, 2007/2008

The findings show that, fuel wood is the main source of energy for cooking and heating in most of Iringa Rural District, especially in Makifu, Mahuninga, Kitisi and Tungamalenga villages. Its demand expands exponentially with population growth (Mwalyosi 1992). This demand exacerbates destruction of the critical wild dog habitats. While electricity could serve as an alternative source of energy, until recently, most areas (including some Village Headquarters such as Makifu, Kitisi) lacked access to this service. Further, even in areas with the service, such as Iringa District, high installation and service costs render its affordability practically impossible to majority of the households. Where the few households have access to the service, high tariffs make its use for cooking and heating. A conceptual model depicts the factors contributing to habitat loss in the Ruaha Ecosystem.

For most people, (including some senior government officials in Iringa Town), electricity is used for lighting and operating radio and TV sets. On average, a family

of six people uses two bags of charcoal weighing between 90 and 100 kilograms per month. The cost of this fuel is between US\$10 and US\$14 per month which is almost 30000 thousand Tsh. compared to US\$35 paid for electricity service. The Figure 4.4 show Sources of energy for Cooking



**Figure 4.4: Percentage of Households by Main Source of Energy for Cooking in Iringa Rural District, 2007/2008**

Source: Field Survey data (2016)

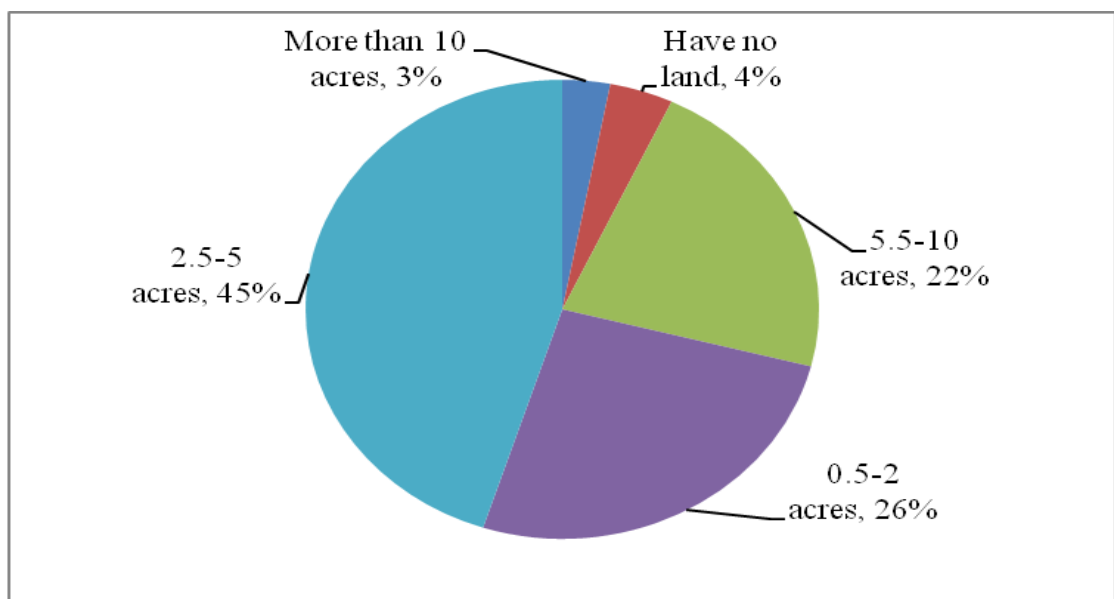
#### **4.18 Inadequate conservation status of some important breeding sites**

Over 80% of Ruaha ecosystem has been included into protected areas network. However, some areas, which are critically important for survival of wild dogs' population, have long remained unprotected or partially protected. Recently, there had been some efforts to accord adequate conservation status to these areas. For example, in Kitisi village there is a den (i.e. the breeding location) at Mdonya and Madogoro. However, enforcement has been minimal. Illegal inhabitants continue to remain inside the PA. Illegal grazing and firewood collection is still going on to date due to inadequate manpower and equipment to patrol the area. Madogoro is a critical

gene pool and migratory corridor for wild dog's specie migrating between RUNAPA and WMA-MBOMIPA and then to the village land where animals get access to water during the dry season. This has remained unprotected against incompatible land uses, despite calls from conservationists to safeguard the breeding sites. Increased permanent human settlements, for example in Tungamalenga village infrastructure developments and investment facilities such as tourist hotels, Camping sites and Lodges minimize the chances of securing the migratory corridor, breeding sites and other social activities of the wild dogs (Author's observation, 20016).

#### 4.19 Status of Land Availability in the Study Area

Study findings show that the majority of respondents (96%) owned land while only 4% had no land at all. The majority (45%) of those who owned land had plots ranging from 2.5-5 acres per household. Others were as follows: 26% owned land ranging from 0.5-2 acres, 22% owned between 5.10 acres and only 2.9% owned above 10 acres per household (Figure 4.4).



**Figure 4.5: Distribution of Land Ownership in Acres by Respondents**  
Source: Field Survey Data (2016)

The land tenure system, land use policies and market conditions may have detrimental impacts on biodiversity. In Tanzania, the land belongs to the State, although most of it (except PAs) is held in a communal type of tenure - often called the deemed right of occupancy. In the study area, the privately owned land outside the core PAs has allowed the local community to respond to market opportunities for mechanized agriculture at the expense of wildlife habitats (Homewood *et al.* 2001; Ottichilo *et al.* 2001b). In both countries wildlife belongs to the State. In contrast to private land tenure, State control of land has the advantage that the State can restrict the policies and land uses likely to cause detrimental impact on wild dogs.

Loss and fragmentation of habitat together represent the greatest over-arching threat wild dogs, which contributes to several of the proximate threats. Because this species lives at such low densities and range so widely. Their populations require much larger areas of land to survive than do those of other carnivore species. For this reason, wild dogs are more sensitive to habitat loss than are related species. In the long term, conserving viable populations of wild dogs is likely to require land areas far in excess of 10,000km<sup>2</sup>, unless very intensive management can be maintained. Fortunately, this species has the ability to survive and breed in human-dominated landscapes under the right circumstances.

Therefore, the large areas needed for wild dogs conservation may be protected, unprotected, or a combination of the two. This species also has excellent dispersal abilities, so that conserving connecting habitat should make it possible to maintain gene flow between populations, and to encourage decolonization of suitable unoccupied habitat, even in landscapes, which have been moderately fragmented in



these villages. Field observation demonstrated that the Makifu village population of wild dogs had great potential for their survival despite the presence of Demographic factors.

#### **4.20 Inadequate Economic Incentive**

Like in many other terrestrial ecosystems, in Ruaha ecosystem wild dog's conservation is pursued along with several other land uses. These uses may be ecologically destructive but economically rewarding. For local people to forgo these uses in favors of conservation, the wildlife-related benefits should be equitably distributed and be able to contribute sufficiently to the local human economy. However, much of the benefits accrue to national or international companies such as Safari firms, tour operators and lodge owners in the study area (DGO & DFO- Iringa Rural 2016).

The local communities receive too minimal amounts, which can hardly offset the wildlife-induced costs and outweigh the returns from alternative (destructive) land uses. Therefore, local people have less incentive to surrender their current livelihood strategies – why should they do so to benefit the government, tourists and foreign investors? Further elaboration is provided below.

#### **4.21 Equity in Distribution**

As stated above, the local communities receive very little benefits from wildlife resources. For example, according to WMA-MBOMIPA annual reports, tourism earned the WMA some US\$ 31 million from 2000 to 2003. Of these only US\$ 0.5 million (less than 2%) trickled down to local communities in all districts bordering

the WMA indirectly through supporting social services (e.g. construction of dispensaries and classrooms). In the MMNR the adjacent local communities receive less than 1% from tourism revenues generated by the WMA -MBOMIPA (2016).

Worse enough, these scanty benefits are often inequitably distributed, between the households and villages. In some villages in the study area it was claimed that the wildlife-related benefits reach neither the victims nor the intended beneficiaries.

The district councils use their share of revenues from tourist hunting for (paying) sitting allowances instead of directing it to local communities. Furthermore, ambiguity emanates from the fact that all villages in the district are eligible to a share of wildlife related benefits regardless of the costs they incur. This renders the communities unable to differentiate between the conservation-related benefits and other handouts given by the government. One village respondent complained that the benefits were going even to people who do not know how an elephant looks like. It was also noted that some local elite in the villages monopolies the benefits thus causing dissatisfaction among community members.

#### **4.22 Failure of wildlife-related benefits to offset the costs**

Despite the current assertions of making wildlife a positive development factor, there is no evidence on improvement of the local economy as noted by one village chairman. He said that “whatever they are getting is purely not proportional to what they deserve” that means their life depends on their land which has been allocated by government for wildlife and forest conservation. The major reason is the failure of the benefits to balance the costs caused by wildlife. Likewise, these benefits are

received as communal goods and therefore, cannot offset the costs borne by individuals or households.

**Table 4.7: Wild Life – Induced Cost**

<b>Organization</b>	<b>Year</b>	<b>Value (USD)</b>
TANAPA- Support	2010	+1500
WD-community hunting (25%)	2011	+3000
Wildlife crop damage	2013	-484,000
Agriculture opportunity cost of WMA-MBOMIPA	2014	-640,000
<b>Total</b>		<b>-1005,100</b>

Source: Field Survey Data (2016)

The cost-benefit estimates in Iringa Rural District shows that farmers bordering RUNAPA and WMA-MBOMIPA, incurred the costs amounting to US\$ 155 per household through crop damage while eviction from the protected areas caused an opportunity cost of over US\$ 670 a year per household (DGO-Iringa 2016). These costs were extremely high compared to benefits granted to each household i.e. some US\$ 2.5 per year. These benefits were indirect as they were granted in form of infrastructure - e.g. construction of classrooms, dispensaries and roads. Therefore, it is not necessary that they addressed people's felt needs and priorities. Yet, majority of the villagers could not access the benefits simply because their villages were not included in the project. This situation may render communities reluctant to conserve habitats for wild dogs.

#### **4.23 Failure to Compete Effectively with Alternative Land Uses**

As Emerton (2001:211) observes, "If there is no domestic economic gain associated with wildlife there will be insufficient for conserving it or for communities becoming involved in conservation activities." This has been proved in the study area

especially in Kitisi village whereby the local community has decided to encroach the ANAPA area for their livestock causing the destruction to the wild dog's breeding sites in Mdonya area.

#### **4.24 Conflict with Livestock Farmers**

Wild dogs are threatened by conflict with livestock farmers in parts of their geographic range. While this specie tends to prefer wild prey over livestock, they may kill livestock under some circumstances and are therefore killed by farmers. Such conflict may involve both subsistence pastoralists and tourism stakeholders. As the specie does not regularly scavenge, wild dogs are less susceptible to poisoning than are other carnivores such as hyenas and leopards, but may be shot or speared. According to a report by DGO – Iringa, one wild dog was observed speared last May-2016 in Kitisi village. The specimen was taken to the Game Division, Ministry of Natural Resources and Tourism in Dar es Salaam for further investigation.

#### **4.25 Environmental Implication of Habitat Loss for Wild Dogs in the Study**

Environmental Change in Ruaha National Park and Lunda Nkwambi Game Reserve

The findings showed that, the area was facing significant environmental challenges caused by the drying up of the Great Ruaha River. The river used to flow all year round, but since 2006 there have been long dry periods in which it has dried up completely. Expansion of irrigation schemes for rice cultivation in Mbarali in Mbeya Region and increased livestock keeping in the Usangu wetlands which feeds the Great Ruaha River are believed to cause the drying of Great Ruaha River. Among the consequences of the drying river are; animal deaths, due to absence of water air pollution, and soil degradation caused by wind erosion

#### 4.26 Ecological impacts

Extensive expansion of arable land, depletion of woody vegetation, reduction of rangelands, soil erosion, and siltation of water bodies and loss of soil productivity attributed to factors discussed in the previous section translate into negative impacts on faunal populations. Hunting of wild dogs (*Lycaon pictus*) is reported to be locally extinct in many areas of the ecosystem - due to the loss of its *Combretum*-and *Brachystegia -spiciformis* dominated habitats which is suitable for wild dogs. DFO of Iringa Rural District reported a negative correlation between the intensity of agriculture and wild dog species diversity and abundance in Ruaha ecosystem.

The abundance of wild dog specie found in agricultural areas East of RUNAPA was 28% of that for the same species in the native savannah. He further reported 50% loss of other ungulates which are common food for wild dog specie in agricultural areas. They attributed reduction of insectivorous to a decline of arthropods following disturbance to the grass layer as a consequence of conversion to agriculture. He cited reduced ability to control insect pest outbreak as one of the negative impacts of reduction in insectivorous birds.

He further pointed out that, “the lack of raptors in agriculture, particularly the rodent specialists (e.g. black shouldered kite (*Elanus caeruleus*) and long-crested hawk eagle (*Spizaetus ayresii*)) that are abundant in savannah, may be related to the frequent outbreaks of rodents such as *Mastomys natalensis*” (Sinclair *et al.* 2002:269). Morell, (1997) attributed disappearance of the previously healthy populations of trogons and large-casqued hornbills to loss of tree cover in the riverine forests. Some bird species, such as shrikes and thrushes, were said to have

moved into the park, while black and white colobus monkeys (*Colobus angolensis*), previously seen along the Ruaha River, moved further west (DGO). Rural communities have also reported the disappearance and reduction of some animal species in areas where they were previously abundant.

The Chief Park Warden reported that wild dogs have abandoned the highly settled areas which were previously used as migratory routes and dispersal areas. Drop in population of browsers in the North-East of RUNAPA and WMA-MBOMIPA was linked to depletion of the woodland vegetation caused by deforestation and unplanned fires (DGO and DFO, 2016). The current unsustainable human activities in the PAs, buffer zones and migratory corridors and, subsequently, reduction in the size of effective conservation area, may accelerate the specie loss.

In Africa loss of wildlife habitats is a widespread phenomenon. The current loss is estimated at 60% (DGO & DFO 2016). Human population pressure is cited as the main contributor to this loss, mainly through deforestation prompted by increased demand for arable land, settlements, fuel wood, timber, and poles for building.

Understanding the root causes and ecological impacts inflicted by habitat destruction on biodiversity is essential in devising the effective mitigation measures. According to local community and observation in the study area, the habitat loss was accelerating rather than abating and that it was taking place largely within the legal boundaries of the PAs. They reported the greatest loss between 1990s and 20015s, despite the great efforts the researchers and conservationists had invested in the area. In the last 25 years about 30 and 40% of PAs' vegetation community has been

degraded, leading to a change in fauna populations (DFO- Iringa Rural-2016). Showing concern over the status of wild dog's habitats in the ecosystem, one of the respondents stated that: "Areas, which we knew as wilderness, are now heavily settled and cultivated. Each day the PAs' becomes more of an island and pressures on its boundaries continue to grow. Most of the respondents said that, by 1980s, Ruaha ecosystem was having dense vegetation and wild animals including wild dogs, were even found in village lands. Currently, the animals' especially wild dogs are rarely observed in village land because the community has destroyed their habitat for poor agriculture and charcoal marking activities in order to minimize poverty.

#### **4.27 Chapter Summaries**

The current chapter dealt with the following areas, Introduction, Sex and marital status, Age of respondents, Education level of respondents, Wild dogs for tourism, Ethnic composition and place of origin of respondents, The extent of habitat loss for wild dogs in Iringa Rural District, Access to clean drinking water, The root causes for habitat loss for wild in the area of study, Demographic factors, Population size and growth, Population density, Poverty, GDP and per capita GDP, Poverty indicators, Income rate, poverty gap, Sources of energy for cooking, Inadequate conservation status of some important birding sites, Status of land availability in the study area, Inadequate economic incentives, Equity in distribution, Failure of wildlife- related benefit to the costs, Failure to compete effectively with alternative land uses, Conflict with livestock farmers, environmental implication of habitat loss for wildlife in the study area, Environmental change in Ruaha NP.and Lunda Nkwambi GR.and ecological impacts.

## **CHAPTER FIVE**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents conclusions of the study findings, results and discussion presented in chapter four. It also presents recommendations.

#### **5.2 Conclusion**

The findings of this study were to assess the habitat loss for wild dogs in Ruaha ecosystem in Iringa Rural District. This study assessed the extent of habitat loss, evaluated the root causes for habitat loss, discussed and examined the environmental implication of habitat loss as the specific objectives and the efforts being made to restore the situation for wild dogs in Ruaha Ecosystem in Iringa Rural District.

Qualitative and quantitative information were collected using Participatory Rural Appraisal (PRA) techniques that included: household interviews, focus group discussions, interview of key informants and field observations. 151 households, 10 focus group discussions in each village and 16 Key informants' questionnaires in four sampled villages of Mahuninga, Kitisi, Makifu, and Tungamalenga were randomly selected for interview. Quantitative methods was used to analyze the data using SPSS and MS Excel computer programs while content analysis technique was used for qualitative information.

#### **The First Objective**

In this objective, the 2007/2008 National Sample Census of Agriculture Report shows that the main source of cash income for the households in Iringa Rural



District, was the sale of food crops (64 percent of small holder households) followed by cash earnings (11 percent), business income (7 percent), sales of cash crops (5 percent), and wages (4 percent) and more than 87% of respondents said that, this activities creates (91%) of habitat loss in the area.

### **The Second objective**

Findings revealed that, high population growth, which create over-dependence to the natural resources, poverty which lead to poor farming, bush fire, deforestation, livestock keeping, were the principal factors which contributed to the habitat loss for wild dogs in Ruaha ecosystem in Iringa Rural District as 91% of respondents knew that it had taken place in their area. The study has also revealed that lack of community involvement, political interference, and poor governance contributed to people having negative attitudes towards wild dog's conservation.

According to population census reports from 2002 to 2012, the population of Iringa Rural District has more than doubled, creating more pressure on land and forest resources. The study also demonstrates that the majority (45%) of respondents owned small pieces of land with area less than five (5) acres while 4% had no land at all. It has also been found that 98% of rural residents in Iringa Rural District depend on fuel wood as a source of energy for cooking and lighting.

Concerning the level of community involvement, the study revealed that, WMA-MBOMIPA involved people from grassroots level. However, the involvement in WMA seems to be restricted to relatively fewer people and not the whole community, which is why the level of awareness is still low.

### **The Third Objective**

The last specific objective was to examine the environmental implication due to habitat loss. The findings revealed that, extensive expansion of arable land, depletion of woody vegetation, for example *Combretum*, and Miombo dominated habitats, reduction of rangelands soil erosion, siltation of water bodies and loss of soil productivity attributed in to negative impacts on fauna populations. This endangered species is reported to be locally extinct in (WMA) areas of Kitisi, Makifu, and Tungamalenga and even in Mahuninga which were the core breeding sites

### **5.3 Recommendations**

Following the findings from this study a number of lessons have been drawn that can be used for achieving conservation objectives of any project including wild dogs in Tanzania.

#### **To the First specific objective**

The Government should make human population growth a priority agenda; government should also consider the alternatives. Limit of the dependence on natural resources for example reduce irrigation permits, livestock keeping and introduction of off farm activities, including involving the communities in community based tourism development and management. Adopt the poverty reduction policies/strategies that are conservation-friendly.

To reduce the pressures on natural resources and habitats, alternative strategies capable of reducing the necessity of encroaching into wildlife habitats should be adopted. Since land shortage in Iringa Rural District is ascribed to poor farming

practices, more equitable and efficient use of the land already under cultivation should be adopted as one of the strategies. Alternative livelihood strategies such as small business enterprises and ecotourism can be secured. In order to reduce heavy dependency on fuel wood the government should subsidize the alternative sources of energy (e.g. solar and electricity and other energies). The agro forestry aforestation programmes should be encouraged in the village lands to provide villagers with their own woodlots.

#### **To the second specific objective**

Enhance conservation education and research. The basic lack of knowledge contributes to destructive activities on wild dog habitats. This is due to failure of the people to consider the long-term consequences of their actions on tourism. Provision of appropriate conservation education is, therefore, important, emphasis should be about the value of wild dogs and their habitats, the consequences of habitat destruction or any loss and ways of mitigating the problem. Involve local communities, institute participatory land use planning and provide adequate conservation incentive. Genuine and effective participation should involve empowering local people to take part in designing, planning, decision making, implementation, benefit sharing, monitoring and evaluation.

#### **To the third specific objective**

Provide adequate conservation status to critical wildlife areas. The government should adopt the vermin control and compensation policies in case of property damage. Discourage policies, land uses and projects likely to have adverse impacts on habitats.

#### **5.4 Areas for Further Research**

Research should be done on alternative livelihood strategies with minimal impact on habitats; evaluating the efficacy, implementation constraints and social acceptability of the alternative land uses and strategies against those threatening the ecological integrity and; identifying the new wild dog breeding sites and habitats along with the effects associated with environmental change and human use. The study suggests further investigation to be made on the right energy options affordable by rural communities as an alternative to fuel wood as source of energy for cooking and lighting.

## REFERENCES

- Baldus, R., Kibonde, B., and Siege, L. (2003). Seeking conservation partnership in the Selous Game Reserve Tanzania Parks. *Conservation Partnerships in Africa 13(1)*, 50-61.
- Bryman, J. (2004). *Marketing Research Text and Cases*. London: Illinois Richard, D. Publisher.
- Butz, S. D. (2004). Science of Earth Systems. Clifton Park, NY: Delmar Learning,
- Convention on Biological Diversity, (CBD) (2011). REDD plus and biodiversity. CBD Technical Series No. 59, United Nations Environmental Programme. Montreal, Quebec, Canada.
- Hackel, J. D. (1999). Community conservation and the future of Africa's wildlife. *Conservation Biology 13(4)*, 726-734.
- International Union for Conservation for Nature (IUCN/ROSA) Environmental Issues series No 1 Harare, Zimbabwe and IUCN/SUWP, Washington, USA.
- Kangalawe, R. Y. M. (2009). Land use/cover changes and their implication on rural livelihood in degraded environments of central Tanzania. *African Journal of Ecology*. 47(3), 135-141.
- Kideghesho, J. R. (2001). Mitigating the loss of wildlife habitats in Tanzania: Current and future strategies. *Tanzania Journal of Forestry and Nature Conservation 74(2)*, 149-161.
- Kideghesho, J. R., Røskoft, E., Kaltenborn, B. P., and Tarimo, T. C. (In Press). Serengeti shall not die': Can the ambition be sustained? *International Journal of Biodiversity Science and Management*, 1(3), 150 – 166.

- Kothari, C. R. (2004). *Research methodology methods and techniques*. 2nd (Ed), New Delhi: New age International Publishers.
- Madulu, N. F. (2001). Population dynamics and sustainable conservation of protected area in Tanzania: The case of Swagaswaga game reserve in Kondoa District. *Demographic Dynamics and Environmental Change*. Dar es Salaam, Tanzania.
- Majule, A. E. & Karonga, S. (2009). The role of local knowledge and innovations in conserving forest biodiversity in Kilombero wetland, Tanzania. *The Icfai University Journal of Environmental Economics*, 7(1) 51-67.
- Makombe K. (1994). *Sharing the land, wildlife, people and development in Africa*. Switzerland: IUCN
- McNamara, C. (1999). *Basic Guides to Outcomes Evolution in Qualitative Research Methods*. London: Sage Publications Inc.
- Miller, G. & Tyler, Jr. (2004). *Living in the Environment, 13th ed*. Pacific Grove, CA: Brooks/Cole-Thomson Learning.
- MNRT, (2008). *The Wildlife Policy of Tanzania*. Ministry of Natural Resources and Tourism. Dar es Salaam, Government Printers
- Mwalyosi, R. B. B. (1992). Land-use changes and resource degradation in South-West Masailand, Tanzania. *Environmental Conservation*, 19(2), 145-152.
- Nelson, F. (2000). Sustainable Development and Wildlife Conservation in in Tanzania Masailand. *Environmental Conservation*, 19(2), 145-152.
- Shemweta, D. T. K. & Kideghesho, J. R. (2000). *Human-wildlife conflicts in Tanzania*. London: SAGE Publications Inc.

- United Republic of Tanzania (URT), (2013). 2012 Population and housing census: Population distribution by administrative areas. National Bureau of Statistics, Ministry of Finance and Office of Chief Statistician President's Office, Finance, Economy and Development Planning, Zanzibar.
- World Bank, (2009). Environmental crisis or sustainable development? Transforming the charcoal business in Tanzania: A policy note. Sustainable Development Africa Region, Retrieved on 2<sup>nd</sup> May 2016 from: <http://www.worldbank.org/tz>.
- Yanda, P. (2011). National economics of climate change in Tanzania: Importance of Reducing Emissions for Deforestation and forest Degradation (REDD). Dar es Salaam, Tanzania.
- Yin, R. K. (2003). *Case study research design and methods (3rd edition)*. Applied Social Research Methods Series. London: Sage publications Inc.

## APPENDICES

## Appendix I: Households Questionnaires

Dear Sir/Madam,

I am a student from The Open University of Tanzania, Kinondoni pursuing a Masters Degree of Arts in Natural Resources Assessment and Management (MANRAM). Aim undertaking a study to assess habitat loss for wild dogs in the Ruaha Ecosystem in Iringa Rural District.

The information being gathered will be purely for academic purposes and will be treated with high degree of confidentiality. You are requested to kindly fill in the spaces provided, or tick or choose appropriate answers.

This part is to be filled by respondents aged 26 and above and with sound minds.

Part 1: **General Information** Tick or fill in the blanks where appropriate:

a. Name of the village ..... Ward .....

b. Respondent No ..... Age: 28 ☐ 36 -47 ☐ 48 and above ☐

c. Marital status: Married ☐ Single ☐

d. Education level: Primary School ☐ Secondary Education ☐ Middle College

University ☐ Others ☐

**A: The Community and wild dog's awareness in the extent of habitat destruction, threat, and loss;**



A1. Where is your place of origin? **1.** Born in the village **2.** Born outside the village but within the District **3.** Born outside the District but within the region **4.** Born outside the region

A2. If you moved into this village, how long have you stayed in this village?  
.....Year's

A3. What was your main reason for settling in this village.....?

**1.** In search of agricultural land **2.** In search of pastures

**3.** Employment **4.** Marriage **5.** Business opportunities other  
(specify).....

A4. How much arable land does your household own? .....Acres

A5. Does the size of your land satisfy household need? 1. Yes, 2, No

A6. If the size of land is not enough, how do you compensate for the deficit?

1. Search for land somewhere else 2. Do petty business 3. Hire from neighbours 4.  
Buy food 5. Other (Specify).....

A7. If your main economic activity is livestock keeping, how many of the following do you possess? 1. Sheep..... Cattle..... 3. Goats..... 4. Donkey.....

A 8. Where do you graze your livestock? 1. On own land 2. On village land

1. Other (specify).....

A9. Is the size of land for livestock grazing enough for you? 1. Yes 2. No

A10. If the size of land is not enough for livestock grazing where else do you take your livestock?

1. in the nearby village forest reserves **2.** Decide to practice intensive grazing by supplying feeds to livestock at home **3.** Take in own farms **4.** Decide to sell some to reduce their number

5. Other (specify) -----

A11. Can you list wildlife species that are either?

i. already disappeared from the ecosystem (i)..... (ii)..... (iii)

ii. close to be disappeared. (i)..... (ii)..... (iii)

iii. vulnerable..... (i)..... (ii)..... (iii)

## **B: Focus group questionnaires**

### **What is the root causes for the habitat loss in this village?**

B1. What do you understand about the term habitat loss?

B2. What do you think can be the reasons.....?

B3. Do you know the animals known as wild dogs.....?

B4. Have you ever seen the wild dogs in your area.....?

i Yes

ii No

B5. If the answer is yes in no B2, which area did you see them.....?

i.....

ii.....

B6.Does your village owns any protected area for wildlife? 1. Yes 2. No 3. I don't know

B7. If the answer to B6.is yes, what benefits or losses do you get from the wildlife conservation?

Benefits.....

Losses/costs.....

.....

B8. Does the wild dog packs comes around your village now days.....?

A.Yes

B.No,

B9. If the answer is yes in No, B8, what problem do they cause...?

i.....

ii.....

iii.....

B10.What is the actual size/area of your village land.....?

B11.Is there any environmental implication do you face since the year 1990 – 2015?

A.Yes.

B.No,

B12. If the answer is yes in no, B11, what might be the causes?

i.....

ii.....

iii.....

B3.Are there any conservation programme (s) practiced in this area by the Government?

1. Yes 2. No 3. I don't know .....

B13. Does the villagers participating in the project supervised by Wildlife Management Areas (WMA-MBOMIPA)? 1. Yes 2. No.

C14. If the answer in No, C13 is yes how do they benefit?

i.....

ii.....

B15. Does the local communities involved in environmental management activities?

Yes

(b) No

B16. If the answer in no, C15 is yes, in what ways?

-----

-----

-----

-----

B17. How do you control the rapid population growth and poverty in your village?

i.....

ii.....

iii.....

### **C Questionnaires for Key Informants;**

CI. Do you have any protected area in or around Iringa Rural District.....?

C2. Were the stakeholders involved in the all process in the formation of WMA-MBOMIPA?

C3. What kind of Carnivores which are found in your area?

i.....

ii.....

C4. Is there any human wildlife conflict in your area.....?

iYes

ii.No

C5.If the answer is yes in no, C5 how do you solve the problem...?

i.....

ii.....

iii.....

C6. Is there any special breeding sites used by carnivores' especially wild dogs in your area..? a. Yes, b. No,

C7. Can you mention those locations used by wild dogs for breeding?

i.....

ii.....

iii.....

C8.Are the wild dogs so 'Threatened' and "Endangered" in this ecosystem?

b. How?

i.....

ii.....

iii.....

C9. Are they breeding well? i.Yes, ii. No,

C10. Why threatened and endangered.....?

i.....

ii.....

iii.....

C11. How can you compare the degree of rapid population growth and poverty towards the habitats loss for wild dog's conservation in Ruaha Ecosystem?

C11. What can you say about conservation needs and people's needs?

1. Addressed conservation needs only 2. Addressed people's needs only

3. Addressed conservation needs more than people's need 4. Addressed people's needs more than conservation needs 5. Equally addressed conservation needs and people's needs

C12. What can you say about wildlife conservation projects about people being aware of the project's aims and objectives?

1. People are well informed of the project's aims and objectives

2. People are not well informed of the project aims and objectives

3. I don't know

C13. Are there any tourists who come to visit the protect areas just for wild dogs?

i. Yes .....

ii. No.....

C14.Does the local community know exactly the values of boundary between their area and protected areas?

i.Yes

ii.No

C15.Is there any environmental implication observed due to habitat loss in this ecosystem?

i.....

ii.....

iii.....

C16. Is there any conservation programmes practiced in your area related to the following; (for forest and wildlife management state any protected area established)

1. Soil conservation.....

2. Wildlife management.....

3. Forest management.....

B18. Are there any by-laws, rules, and regulations which govern the society?

i.Yes, ii. No,

b. List them



i. ....

ii. ....

iii. ....

B18. What are the measures taken against illegal exploitation of natural resources?

i. ....

ii. ....

iii. ....

C19. Is the rapid population growth and poverty one of the habitat losses in your area  
.....?

i. Yes

ii. No

C20. If the answer is in C17, Yes how?

i. ....

i. ....

ii. ....

C21.What challenges have beenfacing in the management of natural resources so far?

i.....

ii.....

iii.....

C22. In your opinion, what should be done to improve the wildlife conservation and protection to minimize habitat loss in Ruaha Ecosystem?

i.-----

ii .....

iii.....

**THANK YOU FOR YOUR PARTICIPATION!**

**My contact;**

**Jossam.Samwel Mungure- 0753-849402**

**The Open University of Tanzania**

**P.O.-Box – 23409**

**Dar-Es salaam**

**Appendix II: Maswali Kwa Jamii (Wenyeji)**

**NDUGU;**

**YAH: UCHUNGUZI WA SABABU ZINAZOCHANGIA KWA KUPOTEA  
KWA MAKAAZI YA MBWA MWITU KATIKA IKOLOJIA YA RUAHA?**

Mimi ni mwanafunzi kutoka chuo kikuu Huria cha Tanzania Kinondoni, nasomea shahada ya Uzamili ya Sanaa katika Usimamizi wa Rasilimali Asili za Taifa. Natural Resources Assessment and Management, (MA-NRAM). Tafadhali naomba nisaidiwe kujibu maswali yafuatayo kwa kutumia karatasi uliyopewa, ukitiki jibu sahihi, na kutoa maelezo kunakotakiwa.

Jina-----

Kijiji-----

Jinsia- (1) Mwanamke (2) Mwanaume

Umri - (a) 28- 37 (b) 37- 48 (c) 48..... na kuendelea.

**A Dondoo kwa wanakijiji;**

**Ni kwa kiasi gani makazi ya viumbe hai hasa mbwa mwitu yameharibiwa au kupotea hapa kijijini?**

A1. Je? unakumbuka asili yako ni mzaliwa wa wapi hapa Tanzania.....?

A2. Je? kama wewe ni mhamiaji ni lini ulihamia.....?

A3. Kama wewe ni mhamiaji ni sababu gani zilikufanya uhamie kijiji hiki  
.....?

i.....

ii.....

iii.....

A4. Je?unaelewa nini kuhusu maana ya makazi ya viumbe  
hai.....?

i.....

ii.....

iii.....

A5. Unawafahamu wanyapori waitwao mbwa mwitu.....?

A Ndiyo.....

B.Hapana.....

A6. Kama jibu na, A5 ni ndiyo, uliwaona wapi?

i.....

ii.....

iii.....

A7. Kuna eneo lolote ambalo limetengwa na kijiji kwa ajili ya uhifadhi wa wanyamapori au misitu .....?

A8. Je? Kuna eneo lingine lililotengwa na kijiji kufidia eneo lililotolewa kwa ajili ya uhifadhi.....?

A9.Je? Kuna faida gani zinazoweza kupatikana kutokana na kuwepo mbwa mwitu kwenye eneo la MBOMIPA?

i.....

ii.....

A10.Je? Kwa nini baadhi ya wanakijiji hawapendi mbwa mwitu.....?

i.....

ii.....

A10. Je? Kuna mabadiliko yeyote ya kimazingira tangu mwaka 2000 hadi 2015?

i.Hapana

i.Ndiyo

A11. Kama jibu na, A10 ni ndiyo unafikiri ni kwa sababu gani.....?

i.....?

ii.....?

A12. Je? wewe na familia yako unamiliki eka ngapi za ardhi zinazofaa kwa kilimo na shughuli zingine .....

A13 Je?wewe ni mfugaji?

(i) Ndiyo (ii) Hapana

A14. Kama jibu na A14ni ndiyo ni aina gani, idadi gani ya wanyama unaowamiliki ?

(i).....(ii).....(iii).....(iv) .....

A15. Je unafikiri jamii inayozunguka kijiji chako imechangia kwa kupotea kwa makaazi mbwa mwitu...?

(i) Ndito (ii) Hapana

A16. Kama jibu ni ndiyo, unafikiri ni kwa njia zipi?

i.....

ii.....

iii.....

iv.....

A17. Je kuna kundi la mbwa mwitu waliowahi/wanaofika katika makazi yenu? (a)

i.Ndiyo

i.Hapana

A18. Kama jibu ni ndiyo je ni madhara gani unayoyapata/mliyoyapata kutokana na hao mbwa mwitu?

i. ....

ii. ....

iii. ....

A19. Je ? ni hatua gani machukua kutokana na madhara mnayoyapata/mliyoyapata?

i. ....

ii, ....

iii. ....

A20. Je wanyama hawa wametoweka au wapo hatarini kutoweka kutokana na kupotea kwa makaazi yao?

(a) Ndiyo (b) Hapana

A21. Kama ni ndiyo je ni maeneo gani katika vijij vyenu ambayo;

i.Wametoweka kabisa -----

ii.Wamepungua -----

iii.Wako hatarini kutoweka -----

A22. Je, unafikiri ni matatizo gani yanayoweza kutokea kwa wanyamapori hasa mbwa mwitu endapo makazi yao hayatadhibitiwa?

i.....

ii. ....

**B Dodoso kwa Watumishi/wataalam wa Serikali;**

**Je? ni madhara gani yanayoweza kutokea kutokana na kuharibuka/kutoweka kwa makazi ya viumbe hai?**

B1. Je? kuna eneo/maeneo yeyote yaliyotengwa kwa ajili ya uhifadhi wa wanyamapori au misitu katika wilaya hii ya Iringa.....?

i.Ndiyo

ii. Hapana

B2. Je? Kama jibu Na, B1ni ndiyo, Wanakijiji walihusishwa katika uanzishwaji wa maeneo husika.....?

B3. Je? wananchi wameelimishwa vya kutosha kuhusu umuhimu wa kutunza wanyamapori na mazingira yao....?

B4. Je jamii imepewa nafasi ya kushiriki katika uhifadhi wa mazingira

i. Ndiyo

ii. Hapana



B5. Kama jibu ni ndiyo kwenye na, B5 ni kwa namna gani?

B6..Kuna tathimini yeyote iliyokwishafanyika kuhusu uharibifu wa makazi na mazingira kwa ujumla.....?

B7..Ni athari gani zinaweza kuwapta wanakijiji endapo mazingira yataharibiwa/kutoweka...?

i.....

ii. ....

B8. Je? ni madhara gani yanaweza kutokea kwa viumbe hai endapo hatua za haraka za kulinda mazingira yao hazitachukuliwa?

i.....

ii.....

B10. Unafikiri mfumo wa taratibu,kanuni na sheria zinazotumika kuhifadhi na kulinda mali asili za Tanzania ni nzuri au zinawakandamiza wananchi na zinahiji marekebisho?

B11. What are the measures taken against illegal exploitation of natural resources?

i.....

ii.....

iii.....

B12. Je? Urasimu,rushwa,na upendele uliopo katika kutoa vibali vya uvunaji maliasili ni mojawapo ya sababu zinazowafanya wananchi kuharibu mazingira?

12. Kwa mawazo yako unafikiri ni hatua zipi zichukuliwe ili kuzuia, kupotea kwa makazi ya viumbe hai....?

B13.

i.....

ii.....

iii.....

**ASANTE SANA KWA USHIRIKINO WAKO**

**Mawasiliano yangu:**

**Jossam.S. Mungure- 0753-849402/0783026323**

**National College of Tourism**

**P.O. Box – 9181 – Dar Es Salam**